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THE OCTOBER MEETING AT PHILADELPHIA.

The committee appointed to make arrangements for the October meeting of the American Gas Light Association met in Philadelphia last week. From reports that we have of the spirit of the meeting there is no doubt that the meeting will be a success. There was evinced a firm determination to make it the best that has ever been held. The subject of an exhibition of apparatus was fully discussed, and the general features of a plan to carry it out agreed upon; a sub-committee was appointed to work out the details which will be duly given to our readers. We deem this a most important question. Our exchanges all bear testimony of the great benefits flowing from these exhibitions, wherever they have been held; and if ever there was a time when increased consumption was demanded it is *now*. We do not hesitate to say that some of the very best means to secure this result are first, to enable the gas manager to familiarize himself with all of the best appliances for extending the use of gas for other than illuminating purposes; secondly, to give the managers an opportunity of seeing the different means for securing the greatest amount of light, for the least consumption of gas, contrasted with each other; thirdly, the proper accommodation of the commercial element that, of necessity, always must be present at all meetings of this or similar associations.

There is no right-minded man, engaged in trade connected with the gas interest, but feels a shrinking from anything that might be construed as trying to mix up "shop" with the deliberations of the Annual Meeting.

On the other hand, almost every member, while attending the meetings, is compelled to avail himself of the opportunity for transacting more or less business for his company. There is no reason in the world why an opportunity should not be afforded to all to transact this business in the least possible time, so that every member could devote himself entirely to the business of the Association, while it was in session, and, during the intervals which occur, be able to examine any or all of the different appliances that he might require, and thus purchase for his company that which, by comparison, was shown to be the best. In plain English the idea is—give to the trade an opportunity to meet their customers upon a trade basis, and reserve to themselves the time of actual sitting in convention for the discussion of professional matters. These points, we believe, may be easily arranged and result in great benefit to all concerned.

The time is rapidly coming when cheap gas will be the demand on all sides. The duty of the Association is to enable its members to make gas cheaply, of good quality, and make a fair profit for their stockholders.

REPORT OF THE PARIS GAS COMPANY.

In another column we give the annual report of the operations of this company for the year 1878. We have given the items somewhat in detail, mainly to show the method of dividing the different items that enter into the cost of gas delivered to the consumer. The amount of gas delivered to 131,434 consumers for the year was about 7,500 million cu. ft., of which the day consumption, due to domestic and mechanical uses, was 1,718 millions.

The receipts for gas for the year were $10,800,000. The total revenue was about 15 million dollars. We commend to the serious attention of managers the large difference between the two sums above named. This difference is explained on page 244; but the short English of it is "residuals." When one-third of the revenue comes from other sources than sales of gas, the natural question arises—1st, "How do *they* do it." 2d., "How can *we* do it."

OBITUARY.

THOMAS WILLS, F.C.S.

It is with sincere regret that we learn, from private letters just received, of the death, in London, at the age of 28, of Mr. Wills.

At the meeting of the British Association of Gas Managers, last June, he was the lecturer before the Association. He had especially devoted himself to gas chemistry, was chemical Secretary of the Society of Arts, Demonstrator in Chemistry at the Royal Naval College, and, for several years, Consulting Chemist of the Phœnix Gas Company, a Gas Examiner to the Metropolitan Board of Works, etc., etc.

For several years he acted as Secretary to a Committee of the British Association, to determine the best methods of improving the illuminating power of coal gas. In connection with the subject of electric lighting he discovered that oxides of nitrogen were given off by the Voltaic arc, thus rendering the light, to that extent, injurious.

His death is a great loss to the gas interest; for, although yet very young, he had already established a reputation of a high order, and, joined to his professional acquirements, was a genial social character which endeared him to all who knew him.

A New "Gas Light Journal."

The *Journal of Artificial Light and Sanitary Gazette* is a new Journal devoted to the objects expressed in its title. It is published in Edinburgh, Scotland, and is a model in type, style and form. We welcome it to the realms of Gas Literature with all the hearty welcome that every Scotchman engaged in giving light to the world is entitled to, and doubt not that this, its first Volume, is the beginning of a long and useful life.

In speaking of the progress of electric light it pays its compliments to us on this side the water, as follows:

"New York has raised its voice against its own offspring. The Post-Office in the great city is now illuminated by electricity, but not by Edison's invention. The mysterious lamp that was to enlighten Menlo Park and its inhabitants by the mere touch of the magician's spring is discarded by those to whom it was practically offered. They have surely looked the gift-horse in the mouth, and so discovered its comparative uselessness. The New York Post-Office is now lighted by a Wallace-Farmer apparatus, and considering the exorbitant cost of gas in the capital of the New World, electricity will, no doubt, prove a success. We shall hear more about the detailed working after a prolonged trial; but, even supposing it to be permanently adopted, it cannot be taken as a criterion by which to judge of the likelihood of gas being subsequently superseded, for there are so many disadvantages attending the use of gas in New York that a Britisher wonders how it is so much in vogue there."

Then, proceeding to give a general account of the Exhibition of Electric Light Apparatus, at Albert Hall, London, on May 7th, winds up as follows:

"There is one system we miss, however, and that is Professor Edison's. There is a vacancy which only the giant tuning fork and dwarfish ship of iridio-platinum can fill, 'Oh, Edison! we have missed you" seems to be the song hummed out by the ceaseless whirr of the machinery as it grinds out the bright but expensive light which has erewhile thrown such a glamor over the public. The modesty which has prevented the wonderful inventions of a still more wonderful man from being seen by *oi polloi* of London cannot but be admired, especially when exhibited by a true born Yankee. We trust, however, that for his own benefit he may some day be able to overcome his bashfulness, and that the Old World may have the chance of seeing an invention which promises to be one of the achievements of nineteenth century science, although the New World may have refused to have anything to do with it. The exhibition closes to-night, but in fairness to both the public and the gas companies, the Council of the Albert Hall should open a similar exhibition of gas apparatus. It would excite just as much, if not more, interest than the one now being held, because the electrical fever is somewhat abated, and the public are beginning to discover powers and resources in gas which have been hitherto hardly dreamed of. To foster and develop this movement should be as much the aim of the Council of Albert Hall as to further the interests of the electric lighting, which until this time has not brought much credit to its promoters."

[From the London "Journal of Gas Lighting."]

Paris Gas Company.

The annual general meeting of the above company was held in Paris on the 27th of March, when the following report on the Company's operations for the year ending Dec. 31, 1878, was presented by the board of direction:

Gentlemen—In compliance with Article 31 of our Statutes, we are about to render you an account of the results of our working during the year 1878, and to show you the position of the Company on the 31st of December last. We are happy to inform you that these results are satisfactory. For the first time in the existence of the Company, the annual consumption of gas has increased by more than 20 million cubic metres (706 million cubic feet). This increased consumption is in all probability to be attributed to the eagerness displayed by the City of Paris to accord a becoming welcome to the numerous visitors who last summer came to admire the splendors of the International Exhibition.

But that which especially merits your attention is the increase in the number of consumers, and the extension of the consumption of gas in the daytime, both of which have attained a figure far exceeding our anticipations.

Thanks to this concourse of favorable circumstances, we have been able to meet all our additional expenses, and to increase from 62 frs. to 65 frs. the rate of dividend we are about to recommend you to declare.

General Review of the Company's Operations.

Consumption of Gas.—During the year 1878 we delivered for consumption a volume of gas equal to 211,949,517 cubic metres (about 7484 million cubic feet), being 20,752,289 cubic metres (732½ million cubic feet) more than in 1877. During the year 1867, which was also an Exhibition year, the consumption of gas increased to the extent of only 14,235,157 cubic metres (502½ million cubic feet).

The day consumption of gas, which takes place between the time for extinguishing and the time for re-lighting the public lamps, figures to the extent of 48,677,603 cubic metres (1718 million cubic feet) in the above total of 211,949,517 cubic metres, and exceeds by 6,203,987 cubic metres (219 million cubic feet) the corresponding amount in the year 1877. This day consumption, which is exclusively due to the use of gas for industrial and domestic purposes, has lately made considerable progress, having, during the past three years, increased to the extent of nearly 50 per cent.

Receipts for Gas.—The receipts from the sale of gas, which in 1877, amounted to 48,205,806 frs., in 1878 reached the figure of 54,025,229 frs. These receipts may be apportioned as follows between the two great divisions of our area of supply:

	Francs.	
In Paris and its environs	50,595,638	
In the outskirts beyond the fortifications	3,429,591	
Total	54,025,229	$10,805,046

Consumers.—The number of consumers on the 31st of December last was 131,434, exceeding by 7256, or 5·84 per cent., the number at the corresponding date in 1877. This is also the first time in the Company's history that the number of new consumers have attained in a single year figures so important.

What are we to conclude from this, if it be not that gas is every day entering more and more into the habits of the people; that it is becoming an object of primary necessity, and is forcing its way simply by virtue of the multiplicity of uses to which it may be applied; also that your Directors were perfectly justified in telling you last year, on a similar occasion to the present, that the trials that were being made with the view of substituting the electric light for gas, would in no way whatsoever retard the development of your undertaking.

Public Lighting.—The number of public lamps in use on the 31st of December last was—

In Paris and its environs	38,220
In the outskirts	6,784
Total	45,004

exceeding by 2518 the number in existence on Dec. 31, 1877. During the year 1877 the number increased by 2306.

*House Services.**—You are aware that for several years past we have been accustomed to gratuitously lay on service pipes in all the houses where we consider there is likely to be a sufficient consumption of gas to adequately remunerate us for our outlay. These service pipes allow the occupiers of the upper stories to obtain a supply of gas with as much facility and economy as if they resided in apartments on the street level, by obviating the necessity for their laying out money in expensive fittings.

This arrangement has contributed immensely to the introduction of gas in private apartments, and these are the results:

During the year 1878 we laid on 227 house services upon the application of landlords, who undertook, at their own expense, to fit up not less than three burners in three apartments, and 903 services upon the application of lodgers, who were prepared to contract for an immediate supply of gas to at least three burners. The number of these services laid during the past year increased to 1130, bringing the total number in use on Dec. 31, 1878, up to 11,666, distributed over 9619 houses. This exceeds by about 50 per cent. the number of house services laid at the close of the year 1875.

These 11,666 house services, exclusive of the branch-pipes, fittings, meters, etc., in connection therewith, which are subject to a special payment, cost 6,924,129 frs. ($1,385,000), which is equivalent to an average cost of 593 frs. ($119), per service.

The receipts arising from the sale of gas consumed by the aid of these services in the year 1878 amounted to 7,481,776 frs. ($1,496,355), and shows an increase of 21 per cent. on the analogous receipts for the preceding year.

With regard to the number of consumers supplied from the house services which, on Dec. 31, 1877, stood at 31,230, on the same date in 1878 it had reached 35,032, representing rather over one-fourth of the total number of consumers.

Show Rooms and Inquiry Offices.—We take this opportunity of reminding you that we have opened at No. 8 Rue Condorcet, No. 40 Rue Lafayette and No. 148 Rue de Rivoli, show-rooms for the exhibition of samples of all the most improved kinds of appliances for lighting and heating by gas, and for affording to those who may be desirous of using it for these purposes all

* These house services, called *conduites montantes*, are pipes carried from the bottom to the top of the buildings, for the supply of flats and separate apartments as in Scotland.

the information they may require as to the price of the apparatus, the cost of fitting them up, the economy resulting from their employment, and so forth. These show-rooms continue to be visited by large numbers of persons, and the service they render is found to be quite what was expected.

Principal Results of Working.—During the first 23 years of the Company's working, the annual consumption of gas, which in 1855 was 40,774,400 cubic metres (1,439,136,000 cubic feet), has increased by 171,175,117 cubic metres (6,042,481,000 cubic feet), or 419 per cent. With regard to the average annual increase, from 1855 to 1874 it remained very nearly constant at about 7,060,000 cubic metres (249,218,000 cubic feet); but from 1874 it has advanced considerably, reaching 12,750,00 cubic metres (450,075,000 cubic feet):

Year.	Annual Consumption. cubic metres. (1 c.m. = 35·317 cu. ft.)	Annual Increase. cubic meters. (1 c.m. = 35·317 cu. ft.)	Annual dividends. Francs.
1874	160,652,202	6,255,084	55.00
1875	175,938,244	15,286,042	60.00
1876	189,209,789	13,271,545	62.00
1877	191,197,228	1,987,439	62.00
1878	211,949,517	20,752,289	65.00

Manufacturing Power.—The manufacturing power of our works, which, on Dec. 31, 1877, was 228,500,000 cubic metres (8066 million cu. ft.), including that of the reserve plant intended to meet cases of accident, or any unexpected increase in the consumption was raised during the year 1878 to 236,500,000 cubic metres (8348½ million cubic feet). We expect that by the end of the current year, upon the completion of the works in progress at the various stations, our manufacturing power will be raised to 238,650,000 cubic metres (8424½ million cubic feet), and be capable of sending out for consumption, after deducting reserve, about 220 million cubic metres (7766 million cubic feet) of gas, thus giving every security for the supply during next winter.

Canalization.—During the past year our main-laying operations have not been so extensive as in previous years. Our entire canalization has, however, increased by 46,360 metres, apportioned as follows:

	Metres.		Yards.
In Paris and its environs	23,552	....	25,750
In the outskirts	22,808	....	24,937
Total	46,360		50,687

Or nearly 29 miles. Consequently, the total length of mains laid under the public roadways has been increased to 1,805,612 metres, apportioned as follows:

	Meters.		Yards.
In Paris and its environs	1,275,865	....	1,394,945
In the outskirts	529,747	....	579,190
Total	1,805,612		1,974,135

Or close upon 1122 miles, which represents very nearly the distance from Paris to Lisbon. The greater portion of the main-laying work was done either at the request of the Municipal authorities, or in carrying out our arrangements with the outlying communes. The remainder was, after consideration, undertaken with the view of meeting certain demands for a supply of light, which it appeared to us would be advantageous to the Company.

On the 22d of June last, the *Administration Superieure* gave their approval to the lighting contract which we had a few months previously entered into with the commune of Ville-d'Avray. The number of communes now lighted by the Company in the districts lying beyond the fortifications, in the departments of the Seine and the Seine-et-Oise, is thus brought up to fifty-one.

The Universal Exhibition.—The Exhibition of 1878 furnished us with an opportunity of showing the successive improvements that had been effected in our plant and manufacturing processes, and of calling the attention of qualified men of all countries to the results of our labors and researches.

The special pavillion which we had erected in the Champ de Mars contained, in a comparatively limited space, a very complete collection of all the various articles and appliances connected with our industry. The drawings there exhibited, enabling the visitor to take in at a glance the whole process of gas manufacture, as well as that of the treatment of the various by-products of the distillation of coal—the coke, tar, and ammoniacal liquor; the collection of the numerous products Science has succeeded in extracting from tar, and from which industry obtains, for the dyeing of fabrics, a series of coloring matters of hues as rich as they are varied; our improved gas-ovens; our special arrangements for jointing gas mains; and, lastly, the appliances for heeting by-coke, the gas-engines, and the refractory products of our manufacture—all these things attracted a considerable amount of attention on the part of the public, and the Jury recognized the value of our efforts and our progress by awarding us a Grand Prize—that is, the highest reward accorded to exhibitors.

Expenses of First Establishment.

You are, of course aware that in proportion as the consumption of gas increases, we are obliged to raise the manufacturing power of our works, to improve our means of distribution, to develop our plant and machinery—in a word, to sink a more or less considerable sum of money, in order to be constantly in a position to meet all the requirements of our business.

During the year 1878 we were specially occupied with the completion of our station at Ivry, the annual manufacturing power of which has been increased from 10 to 25 million cubic metres (353 to 882½ million cubic feet), and in pushing on vigorously our new works at Clichy. As we informed you last year, these works will cover an area of 17 hectares (42 acres), and, when completed, will be capable of producing 75 million cubic metres (2647½ million cubic feet) of gas annually. These works being situated on the banks of the Seine, and alongside the Western Railway, are undoubtedly exceptionally well placed for carrying on their operations to the greatest advantage.

The other works carried out at our other stations have been undertaken with the object of completing the distributing plant, perfecting the methods of condensing and purifying, and bringing the capacity of the coal and coke stores, as well as of the apparatus for the treatment of the coke, tar, and ammoniacal liquor, more into keeping with the manufacturing power of the ovens.

The total amount expended on works of first establishment during the year 1878 was 5,419,755 frs. ($1,083,951), apportioned as follows:

Account of Expenses of First Establishment for the Year 1878.

	Francs.	Dollars.
Expended in the purchase of land etc.	222,246	44,449
Expended on works and plant	2,739,903	547,981
Expended on Mains, services, fittings, etc	2,457,606	491,521
Total expenses of first establishment	5,419,755	1,083,951

The general position of the account of expenses of first establishment may be thus stated:

	Francs.		Dollars.
Amount expended to Dec. 31, 1877	169,860,448		
Ditto during 1878	5,419,755		
Total on Dec. 31, 1878	175,280,203		35,056,041
To meet which there is a capital of—			
In shares	84,000,000 frs.		
In bonds	111,745,739 frs.	195,745,739*	39,149,148
Balance in favor of the Company		20,465,536	4,093,107

Working Account for the Year 1878.

Expenditure.

	Francs.	Dollars.
Value of gas in store on Jan. 1, 1878	25,925	5,185
Materials used in Manufacture.		
Coal carbonized	18,206,185	
Coke and tar for heating purposes	3,536,161	
	21,742,346	4,348,469
Manufacturing Charges.		
Salaries and wages	2,517,560	
Maintenance of works and plant	1,510,742	
Incidental expenses of distilliation	1,043,588	
Purifying material	303,584	
General expenses	78,823	
	5,454,297	1,090,859
Cost of Distribution.		
Salaries of engineers and officers	1,062,529	
Repair and maintenance of mains and service pipes	544,884	
Allowances, premiums, etc	14,004	
Printing and advertising	145,151	
Miscellaneous	51,461	
	1,818,029	363,606

* It follows from an examination of the balance sheet that, out of a capital of 195,745,739 francs, there had been paid off on Dec. 31, 1878, in shares, 8,039,750 francs; in bonds, 8,559,479 francs—total, 16,599,229 francs—leaving 179,146,509 francs ($35,829,300) to be redeemed.

General Management.

	Francs.	Dollars.
Board of Direction	80,000	
Executive Committee	70,000	
Salaries	739,377	
Office and other expenses	254,325	
Service, accidents, relief, etc.	144,387	
Law and other charges	15,683	
Rents and insurances	122,479	
Interest on loans	4,955,966	
Loan redemption fund	1,644,500	
Share ditto	1,323,250	
Cost of experiments, etc.	36,149	
Pension fund	85,500	
Provident fund	104,584	
	9,576,200	1,915,240

Municipal Charges.

Tax of 0.02 c. per cubic metre of gas	3,705,241	
Rating of subsoil	200,000	
Lighting, extinguishing, and maintenance of public lamps	487,524	
	4,392,765	878,553

State Charges.

Taxes	436,734	
Stamps	116,712	
Subsidy to Control Department	8,000	
	561,446	112,289
Total expenditure	43,571,008	8,714,201

REVENUE.

	Francs.	Dollars.
Produce of the sale of gas	54,025,229	
Value of gas in store on Jan. 1, 1879	21,767	
Retort coke	13,585,445	
Furnace coke	425,281	
Tar	2,102,987	
Ammoniacal liquor	345,655	
Rent of meters on hire	1,202,291	
Ditto of fittings, etc., on hire	1,100,802	
Fire-bricks	223,551	
Chemical products	1,159,104	
Sundry works	129,694	
Interests and discounts	507,057	
Total revenue	74,828,863	14,965,773
Balance in favor of revenue, being profit made during 1878	31,257,855	
Add balance of profit from 1877	83,480	
	31,341,335	6,268,267
Deduct reserve to meet claims outstanding on Dec. 31, 1878	141,335	
Balance, being profit available for distribution	31,200,000	6,240,000
Deduct for share dividend	12,400,000	
Balance divisible equally between the Municipality of Paris and the Gas Company	18,880,000	3,760,000

PROVIDENT AND OTHER FUNDS.

Provident Fund.—During the year 1878 our medical staff visited at their homes 1,314 of the Company's servants, who, through sickness, were unable to discharge their duties, and likewise attended 25,181 consultations. The medical fees, medicine, half salaries to disabled workmen, funeral expenses, and donations to the widows and children of deceased servants, entailed an expenditure of 211,904 frs. The account of this fund stands thus:

Expenditure.

	Francs.	Dollars,
Medical fees, medicine, etc., as above	211,904	

Receipts.

One per cent. deducted from salaries, etc.	104,584	
Equal amount given by the Company	104,584	
Interest and sundry receipts	7,341	
Total	216,509	43,302
Excess of receipts	4,605	921

In 1877 also the receipts exceeded the expenses by a very nearly equal sum—viz., 4,650 frs.

On the 31st of December last this fund possessed 65 of the Company's fully-paid bonds, which had cost 33,042 frs., and a cash balance of 4,884 frs., thus bringing up to 37,926 frs. ($7,585) the balance standing to the credit of the fund.

Pension Fund.—The various sums placed to the credit of this fund amounted on Dec. 31, 1878, to 1,711,350 frs., represented by 3,625 partially-paid gas bonds, and 400 three per cent. bonds of the Eastern and Western of France Railways, costing altogether 1,737,165 frs. Consequently the fund was indebted to the Company to the extent of 25,815 frs.

The deduction of 4,500 frs. which we made each year from the amount set apart for this fund, in conformity with the rule, for the purpose of assisting those of the Company's old servants who have become incapable of work, has hitherto been insufficient for the purpose. We have therefore had to grant it a subsidy of 68,963 frs., thus forming a total of 73,463 frs., of which 17,800 frs. are for pensions proper, and 55,663 frs. are for assistance renewable every year. In 1877 this grant amounted to 62,488 frs.

The pension fund has recently been enriched by a legacy of 20 of the Company's shares, owing to the generosity of M. Hervé, the Director we had the misfortune to lose at the beginning of last year. M. Hervé also bequeathed to the Company a sum of 50,000 frs. for the purpose of establishing two perpetual scolarships in his name at the Ecoles des Arts et Métiers at Châlons and at Angers, to be held by two children of the Company's servants selected from among the most meritorious and most destitute of fortune. This sum is to be invested in Three per cent. Rentes, and if at any time the product exceeds the expenses, the balance each year is likewise to be invested in Rentes.

Savings Fund.—This fund, which dates from the 1st of July, 1876, was established with the object of affording to the Company's servants the means of putting away, without expense or loss of time, whatever they might be able to save each month out of their earnings. From the date of its formation up to Dec. 31 last, 2,930 accounts have been opened, and the balance sheet stands as follows:

	Francs.	Dollars.
Amount received on deposit	465,242	
Out of this sum there has been repaid—		
In cash to 1,682 depositors, 563 of whom have left the Company's service	167,564 frs.	
In vouchers to 137 depositors whose payments exceed 500 frs	77,311 frs.	
	244,875	
Balance on hand Dec. 31, 1878	220,367	44,093

The continued extension of the operations of this fund testifies to the development of habits of order and economy among our servants, and you will appreciate, as we do, the utility of a measure which, without being burdensome to us, forms an additional bond of union between the Company and those who afford them the co-operation of their intelligence and labor.

Special Reserve.—You are aware that by virtue of our treaty with the Municipality of Paris, dated Feb. 7, 1870, the City, at the termination of our concession, will be entitled to one-half the value of the Company's available assets. The special reserve fund, which was instituted in conformity with Article 40 of the Statutes, was for the pupose of providing, between the present time and the year 1905, an amount of capital which, as far as possible, would compensate for the share of the invested capital which would then be taken by the city, and thus to render more complete the security of the fully paid-up shares.

LABOR, MATERIALS, REIDUALS, ETC.

During the year 1878 the average price of labor remained about the same as in 1877, and we have had again to congratulate ourselves upon the amount of work performed by our workmen, and the exactitade with which they have attended to their duties.

Last year, as in 1867, we deemed it incumbent upon us to take into consideration the exceptional expense which the temporary advance in price of all the necessaries of life occasioned to our servants during the period of the Exhibition, and we have awarded to our workmen, and to those of our inferior officers whose salaries do not exceed 2,400 frs. per annum, an indemnity very nearly equal to half the usual gratuity they receive at the end of the year. This exceptional charge on the working expenses of the year 1878 amounts to 159,700 frs. In 1867 this extra expenditure amounted to 140,000 frs.

Coal.—During the year 1878 the average price of coal continued to improve. We profited by the fall which succeeded the high rates of the past few years, to renew those of our coal contracts which were about to expire,

and to enter into fresh contracts. We may therefore reckon upon a further reduction in the year 1879. It must not, however, be lost sight of that the reduction in the price of coal brings about a diminution in the price of coke, the most important of our residual products, and that such diminution counteracts, to a great extent, the economy realized in the purchase of the coal.

Retort Coke.—The rigorous winter through which we have just passed enabled us to clear off the greater part of the coke produced during the year, which, in round numbers, exceeded by 1,200,000 hectolitres (92,307 chaldrons) the production in the preceding year; but in order to do so we were compelled to lower our tariff to such an extent as to exclude from our field of operations all competing cokes and coals. This reduction was the more necessary, inasmuch as the winters of 1876 and 1877 were exceptionally mild and we had on hand Jan. 1, 1878, a stock of coke exceeding by 1,726,000 hectolitres (132,769 chaldrons) that in existence at the same date in the preceding year. An article of merchandise is, in fact, only worth what it will fetch, and the sale of coke, like that of all other products, has to be subject to the law of supply and demand, with this unfavorable circumstance attending it, that when the winter is mild people do not burn coke, and consequently will not have it at any price.

These remarks explain how it is that the amount produced by the sale of coke, which in the year 1877 was 14,253,555 frs. ($2,850,711), in 1878 only reached 13,585,445 frs., being a diminution of 668,110 frs., which is very nearly equal to the amount saved in the purchase of our coals.

With regard to the produce from the sale of metallurgic coke, this amounted to 425,281 frs., which is lower by 122,666 frs. than the sum realized in the preceding year. This diminution is due alike to a decrease in the production, and to a reduction in the selling price to manufacturing establishments.

Heating Apparatus.—In the course of the year 1878 we sold 2,272 appliances for heating by coke, being 801 more than in the year 1877. This brings the number of heating apparatus sent out from our works up to 46,795 nearly the whole of which are in operation in Paris.

Tar and Chemical Products.—We continue to devote considerable care and attention to the treatment of the tar and ammoniacal liquor resulting from the manufacture of gas. These residual products all find an easy sale, and on very advantageous conditions. The sulphate of ammonia especially, which formerly was only employed in the manufacture of alum and certain composite manures, now finds, in its application to agriculture, where it is employed alone in considerable quantities, so to speak, an unlimited market. The net amount produced from from this manufacture increased in 1878 to 3,262,090 frs., apportioned as follows:

	Francs.	Dollars.
Treatment of tar.....	2,102,986	
Treatment of ammoniacal liquor..	1,159,104	
Total.....	3,262,090	652,418

Gas Engines.—During the year 1878 we sold two horizontal engines on Lenoir's system, 19 vertical engines on Otto and Langen's system, and 30 of Otto's horizontal engines; making the total number of 820 engines—horizontal and vertical—that have left our works during the past 16 years. The two latter kinds of engines, which, unlike the former, do not require the employment of electricity, are susceptible of a tolerably large number of applications, and, for small manufacturing operations, might be used with considerable advantage.

We may estimate at 1,000,000 cubic metres (35,300,000 cubic feet) the amount of gas consumed in 1878 by the gas-engines annually working in Paris.

Lighting by Electricity.—On the occasion of our last meeting, we alluded to the trials of electric lighting that had been instituted in several parts of Paris, and we proved to you—supporting our statements upon considerations at once scientific, practical, and economical—that the gas industry had nothing to fear from these trials. Having laid it down as a principle that, in the matter of illumination, a mild and uniformly diffused light, resulting from the employment of a large number of not very intense luminous centres, is preferable to the hard and unequal light obtained by means of a small number of very brilliant luminous centres, we said:

"That which really constitutes the security of our industry is this—that gas is, above everything else, cleanly, simple, and economical in application; that when once it is lighted it burns indefinitely, without requiring any attention; that it may be extinguished and relighted as often as may be necessary; and that, finally, its flame may be increased or diminished, according to requirements, and caused to give the light of the finest lamp, or to furnish the mere glimmer of the finest night-light. Gas is, besides, continually at the disposal of the consumer, day and night, in whatever quantity he may desire, and it can be applied equally well to lighting, heating, and the production of motive-power. To obtain it, all that is required is to turn on the tap."

Then we added—

"In the manufacture of gas, the raw material—the coal—is very nearly paid for by the residual products obtained from it, and it may be admitted as a truth that the processes for the production of light which, instead of directly utilizing the coal, as we do, burn it in order to transform it into motive power and produce electricity, are necessarily very expensive."

The experiments in the Avenue de l'Opéra, which we have followed with much attention, only confirmed the opinion we conceived of the complicated innovation. It does not appear to us to be worth while to enter now into long technical details on the subject of the production of the electric light, its cost, etc. The English, French, German, and American newspapers have published numerous articles on the advantages and inconveniences it presents.

Everybody knows that the light is unequal in intensity and variable in color; that in foggy weather its power decreases with distance much more quickly than is the case with gas; that in reality it is whiter and more dazzling than light-giving. It is equally well known that it necessitates the employment of a considerable amount of motive power, an electro-magnetic machine, and a multiplicity of delicately-made conducting wires; and finally, that it is subject to frequent sudden extinction, and consequently is of so unreliable a character as to be quite incompatible with the exigencies of a service of such importance as that of the public lighting.

But what people are ignorant of, and what is good that they should know, is that in the Avenue de l'Opéra a 20-horse power engine is required to supply 16 electric lamps, spread over a length of some 360 metres (393 yards), and that the application of the electric light to the 1,800 kilometres (1,100 miles of streets in Paris, at present lighted by gas, would necessitate the employment of a motive power of 100,000 horses, or more than double that which is employed for all the manufacturing operations in the departments of the Seine and Seine-et-Oise; that an electric lamp like those in the Avenue de l'Opéra does not give more light than 11 gas jets consuming 140 litres (5 cubic feet) per hour; that, consequently, for equal illumination, the electric light is much dearer than gas; and that, if it can be adopted in certain special cases where expense is not regarded, it can never seriously compete with gas, because it possesses different qualities, and does not supply the same needs.

You are doubtless aware that, at it sitting on the 28th of January last, the Municipal Council refused to accede to the request of the Société Générale d'Electricité for a concession for three years of the lighting of a certain number of public thoroughfares in the neighborhood of the new Opera House. The reasons for this refusal are fully set forth in the report of the committee appointed to consider the matter.

These conclusions confirm in all points our preceding observations. The Municipality asked themselves whether it was absolutely necessary, in order to improve the lighting of the public thoroughfares, to have recourse to electricity, when they had in their hands, by the use of gas, so simple and economical a means of doing so.

Although, according to our contract with the Municipality, we have nothing to do with the construction, supply, or repair of the public lamps—we having only to supply the gas consumed therein—we have considered it would be interesting to enlighten the public as to the possibility of obtaining with gas light-centres quite as intense as the electric lamps in the Avenue de l'Opéra, and we proposed to prove that, for an equal outlay, gas furnishes much more light than electricity.

The Rue de la Paix is already an example of the improvement that might be effected by placing the public lamps closes together. The experiments that are about to be made in the Rue du Quatre Septembre, in the place du Chateau d'Eau, and in one of the pavilions of the Halles Centrales will allow of an estimation of the the results that may be obtained by combining the reduction of the distance between the lamps with an increase in the amount of gas consumed at the burners. They will demonstrate, in fact, that gas, when burned in sufficient quantity in appliances suitably placed, is capable of producing a much more powerful concentrated illumination than was generally supposed; that its light is quite as susceptible of multiplication as of division; that, for large as well as for small consumers, lighting by gas still remains par excellence the most practical and economical system of illumination.

We hope, gentlemen, that the details into which we have just entered will dispel any apprenensions that may be aroused in the midst of some of you by the experiments, so diversely appreciated, in the Avenue de l'Opéra.

Austin Gas Light Co., Texas.—At the annual meeting of the Austin Gas Light and Coal Company the following officers were elected:—S. Watts, President; C. F. Millett, Vice-President; J. F. Breckenridge, Treasurer; J. M. Swisher, Secretary; and M. C. Holmes, Superintendent. At the first meeting of the board the price of gas was reduced from $5 $4 per thousand feet.

From the "London Builder."]

The Night Lights of Old London.

[Continued from page 226.]

GAS.

This exhibition at the Lyceum Theatre, Strand,* naturally caused a large amount of excitement, for Winsor not only lectured on the merits of gas, but gave practical evidence of its usefulness, notwithstanding many unfortunate circumstances, such as being connected with assistants not always ready to help him. and the impure nature of the gas itself, the smell of which caused a dislike among the audience, however much they appreciated the light.

Even at that time the actual saving in the cost of the old and new system was detailed, for while the old oil-lamp lighting at Phillips & Lee's factory cost £2,000 a year, the new gas light—and a better light, too—had only cost £600. Then again, to show how opinions differed, while the most enlightened chemist of his day, Humphrey Davy, declared that the adoption of gas in the metropolis would cause a terrible explosion, the insurance companies, on the other hand, considered Phillips & Lee's factory so much safer by its use than when candles were employed that they did not object to the system.

It was in 1805 that Winsor started by circular his project for "The National Light and Heat Company," which offered "a mine of wealth in Britain, and would add to the despair of our foes their devices for our ruin." "Two houses are now fitting up as a standard for a general introduction of gas lights, now clarified to their utmost brilliance. The £5 deposit will suffice for realizing the plan in London and its environs, and all further sums wanting will prove but a small deduction from speedy profits. The official experiments as the basis of my greatly under-valued estimates will be repeated to any number of subscribers." He supplemented this circular by several others in 1806 and 1807, in one of which he maintains that his company is of a more solid character than any other, for "it exceeds in benefits the water companies by gaining four valuable products from the destruction of a great nuisance—that of smoke." He says that three years before, £10,000 was subscribed by one hundred subscribers to form a coke company. "because many of those gentlemen were fully persuaded that my coke being introduced would alone make their fortunes." And, although the nominal sum of £50,000, in £5 shares, was mentioned for the company's capital, and hints thrown out that over £500 a year could be easily earned by each shareholder, it took much patience and perseverence to make the world believe that the scheme was not a bubble.

However, it was in the year 1807 that London street folk were made to realize the actual progress in gas lighting, and whatever may have been Winsor's defects in practical chemical knowledge, he certainly was not defective in perseverence. In that year was exhibited the first London street lighting, and that was in Pall-mall. The new company, which had its offices at Nos. 97 and 98 in that thoroughfare, lighted up one side of the street on the 28th of January, and on the king's birthday, June 4th, both sides. In the evidence given before a Parliamentary committee it was stated that the length of gas pipe in Pall-mall was 1,700 feet on the south side; that the new gas light was equal to 18 of the old lamps; that two chaldrons of coal would keep 800 of Winsor's burners alight for 11 hours; and that adapting a house in the street for a stove would cost £500. The first outdoor experiment had been by conveying a pipe to the top of the house, from which issued a single flame, but the novelty of which drew vast crowds. Winsor then proposed to light the whole parish of St. James, Westminster, for £26,546. This would include 65,500 feet of iron piping, 6 stoves in various parts of the parish, with two men and a boy at each. There were 2,200 street lamps in the parish, each costing 25s. per annum. They would be placed 70 feet apart, the old lamps being from 30 feet to 40 feet. But with all the dazzling advantages held forth, and six months' elaborate experiments, the public declined to be so sanguin of the success, and as a result, after a loss of something like £10,000, the National Light and Heat Company came to an untimely end.

From Pall-mall the spirit of illumination extended itself to a less aristocratic thoroughfare, Golden-lane, where, on the 16th of August, 1807, the brewery and part of Whitecross and Beach streets were lighted up. But although every means was tried to get a favorable reception for the gas, everything failed until 1809, when the Chartered Gas Light and Coke Company, with a capital of £200,000, applied to Parliament for an Act of Incorporation, "for procuring coke, oil, tar, pitch, ammonial liquor, essential oil, and inflammable air from coal, and for other purposes." Of course great opposition met the application from Murdoch, Watt, and others, and a failure of the fisst attempt was the consequence. But in the following year the company applied again, when, special conditions being incorporated, which stipulated that the streets of London. Westminster, and Southwark should be lighted cheaper by gas than with oil, the bill was passed, and a charter directed to be granted within three years. The company, however, found out that they had made miscalculations, for laying down pipes in Westminster alone was found to entail an expense of £150,000, while experiments and purchasing a wharf at Cannon-row would cost at least £40,000 more. Yet, nothing daunted, they persevered, and immediately after they obtained the 21 years' charter, which is dated the 30th April, 1812, the company purchased sites at Peter street, Westminster, Brick-lane, Spitfields, and Curtain-road, Shoreditch, and set about making gas in earnest.

It would be impossible for us to detail all the extraordinary events in connection with the introduction of gas into the streets of London, but we think a few facts long since forgotten may at this point of our narrative be introduced. We think it will interest many of our readers to read one of the advertisements issued by the company immediately after their first failure to get a charter in 1809:

"*Ten Thousand Pounds.*—Wanted, Two or Three Partners, in a most capital and important concern, being the sole establishment of the kind in Europe, that will bring in from £10,000 to £20,000 per annum, and more than double that sum in a few years. This will be secured by an exclusive patent during fourteen years, and is expected afterwards to be farther secured by an Act of Parliament. Each Partner must advance £5,000. The concern is so highly respectable that the first nobleman may most honorably hold a share in the face of the world, it being a public and private benefit to the human race, as well as of very general national advantage. Every communication will be fairly and candidly given to Principals alone, who may apply by letters (post-paid) to S. SMITTMAN, Esqre., and left at 187, High Holborn."

Even at the present day few persons are aware that this interesting advertisement related to the first London gas company. That there were some Londoners ready to take advantage of the new light, and make it the means of advertising themselves, is proved by several shopkeepers introducing the gas into their shops, and using brackets of an attractive form. The company having laid their pipes from Curtain-road to the City, celebrated the event by a dinner at the New London Tavern, and gaily decorated the place for the occasion. Then, again, a Mr. Gregory, of Norton Folgate, lighted his shop and house by means of curious and fanciful devices, among which were a figure in the act of smoking, holding in his hand a lizard, with lighted gas issuing from its mouth; a glass Chinese vase, with starlights; a glass chandelier, and two images on the mantel piece of his sitting room, which naturally caused in 1813 as much excitement as did the exhibtion of the new electric light at Messrs. Wells's Shoreditch establishment in 1878.

Another individual to take up gas lighting in its earliest days was Mr. Ackerman, at No. 101 Strand, who in 1812, with Mr. Clegg's assistance, used it in his library, warehouse, printing office, and dwelling, by which he saved at least £120 a year. It was during its first exhibition here that a lady of title called upon him and offered a large sum for the lamp, desiring to take it home in her carriage, not thinking what the process of producing the flame actually was. And Messrs. Loyd, thimble makers, of Queen street, Southwark, used the gas for soldering purposes at about the same time.

It may be here stated that the success of Mr. Clegg's plan of lighting up Ackerman's premises caused him to be engaged by the Chartered Company as engineer at their works. "At this time," writes he, "the company was nearly on the point of dissolution * * * * lighting a town with gas was still thought a visionary scheme. Sir Humphrey Davy considered the idea so ridiculous that he asked if it were intended to take the dome of St. Paul's for a gasometer. To which Mr. Clegg replied that he hoped to see the day when gasometers would not be much less. They are now (1841) made 100 feet diameter and 39 feet deep!" What would our famous Davy have said had he lived to our time, to see the gasometer of the Imperial Company in the parish of St. Pancras, which is 618 feet in girth?

Like all new things, as it is a privilege to have them condemned before being actually tried, so it was with gas. The company tried hard to overcome prejudices, fitting up houses and shops free of expense, and instructing Mr. Clegg to make a particular burner to overcome certain scruples of the insurance offices. When the pipes were being laid down in the passages of the House of Commons, the architect suggested that there should be at least 5 inches space between them and the walls, under the belief that the pipes got red hot, while, because manufacturers did not seem inclined to make welded pipes, old musket barrels attached to each other were used! Added to which the company's shares, which had cost £10, would not sell for £2, and a series of unfortunate mishaps at the works did not improve matters by a long way.

* History seems to repeat itself; the electric light, in its new form, was first popularly shown at the Gaiety Theatre.

All these things, and many more, made the progress of gas lighting in London, during the first few years, a very slow one indeed. But in the City itself, at the date at which we write, while these things were beginning to assume a position equally progressive, there were several incidents in the manufacture of gas perhaps of greater interest. Among the ingenious inhabitants of Fleet street was a William Knight, who, at the suggestion of Mr. Frederick Sparrow, of Ludgate-hill, erected an apparatus for the purpose of making the new light. It may be readily imagined that the process was not an agreeable one to the neighborhood, and consequently in May, 1813, he was indicted for the nuisance.

Those now living may not be aware that these experiments were carried on at the rear of 183 Fleet street, Fetter lane, and the present generation will no doubt smile when they read the presentments of the St. Dunstan's inquest of the 21st December, 1813, which Mr. T. C. Noble has extracted from the original minutes, and obligingly communicated to us, and which is now printed for the first time:

"They do upon their oath present William Sturt, of No. 183 Fleet street, in the said parish of St. Dunstan-in-the West, in the said Ward of Farringdon Without, in the said City, for continuing by the space of three months now last past, and until the day of the date of this presentment, the making of gas light, and making and causing to be made divers large fires of coal and other things for the purpose aforesaid in and upon the premises situate as aforesaid, and with the said fires, and also with divers materials, liquids, and preparations, making and causing to be made, sending forth and emitting thereout divers great quantities of noisome, offensive, and stinking smoke, smells, and vapours, by means whereof the air there during all the time aforesaid was, and yet is, filled and impregnated with divers noisome and offensive stinks, and smells, and vapours, and the dwelling houses near the same were and are thereby rendered and become unhealty, unwholesome, and uncomfortable to his Majesty's subjects residing therein, and passing and repassing in and near the same. And is a public nuisance in the said parish of St. Dunstan-in-the-West. For which said nuisance so continued by the said William Sturt as aforesaid, one William Knight, the preceding occupier of the said premises, was indicted at the Session of the Peace holden in and for the said City in May last and which said indictment stands adjourned."

Knight and Sparrow had already taken steps to carry out the gas lighting in the City, and the site they pitched upon for their works was already classic ground—Whitefriars. Mr. Noble, in his "Memorials of Temple Bar, with some Account of Fleet Street," describes fully the historical character of the district. Here stood the monastery of the Carmelite Monks, or the White Friars, founded so long ago as A.D. 1241, and here was the "Alsatia" rendered famous by Sir Walter Scott. Here in the good old times the nobility and the gentry did not scorn to live; and here, upon the very site of the subsequent gas works, stood the celebrated theatres the Whitefriars, Dorset Gardens, and Salisbury-court—the last of the play-houses disappearing in 1709. Then the ground was occupied by the New River Company for offices, who in turn sold it to Messrs. Sparrow & Co., subsequently known as the City of London Gas Light and Coke Company, who, armed with the necessary power, commenced here their extensive works, for the purpose of lighting the City.

On Christmas morning, 1814, the first public lighting in the City, between Temple Bar and the West end of Cheapside, and Newgate street to Holborn Bars, with all adjacent thoroughfares, was inaugurated, and on the 26th of the following January the gas was introduced into the houses and shops. A public print of the time tells us, "The machinery and apparatus are most completely and philosophically arranged. * * * A purity of light, combined with a steadiness of flame, which was never before acquired."

But the new works had not been in existence very long before Sparrow & Knight were indicted for a nuisance, the old indictment being slill kept over their heads. They pleaded that they were still making experiments at great cost, which they trusted would prevent further complaints, and the cause stood over until January, 1816, upon the understanding that in the meantime all should be satisfactorily arranged, and the result was that nothing further was heard of it.

After an existence as a private firm for some three years, "An Act for better Lighting the Streets and Houses of the Metropolis with Gas" was passed the 23d of May, 1817, which incorporated Frederick Sparrow, Henry Sparrow, James Lynn, Timothy Tyrell, and sixteen others, as "The City of London Gas Light and Coke Company," for a term of 46 years, giving them power to raise a capital of £200,000, in £100 shares, within five years, and "to make inflammable air or gas, and also coke, oil, pitch, tar, arphaltum, ammoniacal liquor, and any other products to be obtained from the manufacture of such air or gas, and to sell or dispose of the same respectively in such manner as they shall think proper"

Retracing our steps a few years, we must again quote Mr. Clegg's description of the early days of the first gas company—the Chartered. In 1813 his father commenced the works in Peter street, Wesiminster. The ground upon which they were erected was a swamp nearly on a level with the Thames, and formerly overflowed by the river. It was therefore impossible to sink for a tank; an iron one was too expensive; hence the production of Clegg'r revolving gasometer, also too expensive for general use. Government inspected the work, and Sir Joseph Banks and others recommended that no garometer should contain more than 6,000 cubic feet of gas! And it was a great evidence of their supposed judgment when, a few months later, an explosion took place here, shattering the windows in the neighborhood, and severely injuring Mr. Clegg.

"On the 31st of December, 1813," writes our informant, "Westminster Bridge was lighted with gas. It soon became an object of attraction, and, while the novelty lasted, was a fashionable promenade. The lamplighters were much startled by the new system, and refused to act, and Mr. Clegg had himself to light the lamps for a few nights." On the 1st of April following the old oil lamps were removed from St. Margaret's parish, and gas burned for the first time, this being the first parish to apply to the company for a contract. Hundreds followed the lamplighter with his torch, and when Mr. Grafton's hand lantern was invented it was thought to be another stride in the right direction. Then, later, came the man with box of matches and ladder, and now the only instrument which the lamplighter uses is the "magnetic," wizard-looking wand.

Of course, the old oil lamp contractors complained loudly against the innovation. At one meeting between them and the parish, one of the guardians told them their oil lamps gave no light. This was, to all intents and purposes correct; but the contractor had his reply ready. His contract stipulated they were to be kept lighted from sunset to sunrise. but the body of light was not contracted for!

Strong prejudices long continued, and among the earliest battles between the Chartered Company and the parishes was the right of erecting the lamp posts. When the allied sovereigns visited England in June, 1814, the gas devices at the illumination were very brilliant. The Chinese pagoda, erected by order of the Government over the canal in St. James Park, and lighted up with 10,000 gas jets, was a brilliant sight, and luckily a "private" lighting up showed roalty its beauty; but, on the night of the general illumination, Sir William Congreve having, against advice, let off some fireworks near it, accidently set fire to the wooden erection, which burnt the whole to the water's edge. It was very unfortunate for the gas company, who had not the largest number of friends, for a report soon spread that it was all through the dangerous gas. At the banquet on lord mayor's day, in the following year, the Guildhall was first lighted. "The profuse delicacies of the table, the waving of feathers and sparkling jewels of the ladies, the mild splendor of the gas, shedding a brightness clear as summer noon, but undazzling and soft as moonlight—altogether formed a magnificent combination, worthy the inauguration of the presiding citizen of the day." Those who have been eye-witnesses of the lighting up of this fine hall, with its thousands of gas jets and its long celebrated "Copeland" star in modern times, will fully believe the City made a step in reform over sixty years ago in substituting gas for the primitive wax candles and oil.

With respect to the general lighting up of public buildings, the poet, Thomas Moore, went with Lord and Lady Lansdowne, on May 6th, 1822, to see St. Paul's Cathedral lighted, and seven theatres were also illuminated the same year, the last to adopt gas being the Haymarket, in April, 1853, the original proprietor by his lease stipulating that only oil lamps should be used. The first church clock lighted with gas was that of St. Giles-in-the-Fields, 23d of April, 1827, and its inventor received the silver medal of the Society of Arts. The second church clock illuminated was that of St. Bride's, Fleet street; the third, Whitechapel; and the fourth, Islington. We have been told that Shoreditch Church was one of the earliest, if not the first, lighted up in the interior—it being for a long time thought it would be a profane innovation to allow gas within sacred precincts. As we have already stated, the last outdoor place to adopt gas was Grosvenor square, and that was just forty years ago.

In 1815, by patent dated December 9th, Samuel Clegg, the Chartered Company's engineer, brought out his "Improved Gas Apparatus,"—the first gas meter. The "dry" gas meter was patented in 1834. At the time of Clegg's retirement from the gas company, in 1817, their three stations produced 300,000 cubic feet of gas, using 25 chaldrons of coal daily; the City Gas Works used 3 chaldrons, and by computation the whole produced gas for 76,500 Argand lamps, each lamp equal to 6 candles. In 1819 Messrs. Taylor & Martineau erected an apparatus at Apothecuries' Hall for making oil gas, and in May, 1821, the Whitechapel and Bow Works adopted the invention, as did also Covent Garden Theatre, Whitbread's brewery, and the Argyll rooms.

Early in 1822 a Royal Commisson was issued to inquire into the subject of gas lighting, and it may be interesting to our readers to have a summary of the facts produced in evidence. There were three companies supplying London: the Chartered, who had 15 gasometers at Peter street, 12 at Brick lane, and 6 at Curtain-road—total, 33; the City had 8 at Whitefriars; the

South London (afterward the Phœnix) had 6 at Bankside. The total number of the gasometers was therefore 47; total contents, 917,940 cubic feet of gas. To make which, 33,158 chaldrons of coal were carbonized, producing 41,447 chaldrons of coke. There were 22,819 bushels of lime used annually, and the mains (or pipes) covered 210 miles of ground! The Chartered Company supplied 8,749 public lights and 21,886 private ones; the City, 2,413 and 5,423; the Bankside, 1,000 and 3,038. The Chartered supplied 8,586 houses and 172 public buildings, including 7 theatres. The extent of ground covered by the three companies ranged from Brompton to Islington, Kingsland-road, Whitechapel, Dockhead, Camberwell-gate, and Marsh-gate, Lambeth.

The South London Company, which commenced work in 1816 in a retort house at Bankside, subsequently (says Mr. Z. Colburn) occupied by Messrs. Rennie as a boiler shop, was incorporated as the Phœnix in 1824, and afterward extending their works to Greenwich and Vauxhall. The Imperial was the next company, established in June, 1821, who erected works at St. Pancras, Hackney-road, and Fulham. Then followed in due order of time the Ratcliff, 1823; the Independent, at Haggerstone, 1825; the Equitable, at Pimlico, 1830; the South Metropolitan, in the Kent-road, 1834; the Commercial, at Stepney, 1840; the Surrey Consumers, at Rotherhithe; the Western, at Kensal Green, 1849; and the Great Central, at Bow Common, in 1850–51—in all, 13 companies, owning 19 works, all of which, except 2, were a dozen years ago within 4 miles of Charing-cross.

It was estimated in 1861 that they carbonized 882,770 tons of coal annually, making over 8,000 million cubic feet of gas, which was sold (except one-eighth lost by leakage) for £1,411,788. The total capital employed amounted to £5,602,900; the profit from which, exclusive of interest paid, was stated to be £410,697. At the end of 1874 the gas rental was £2,606,818, and the 13 companies supplied gas to 54,109 lamps, running over 2,500 miles of streets, each light equaling a dozen candles. Half a century previously there were 12,000 public lights, which cost 15s. per 1,000 feet of gas, or nearly four times as much. And another half a century earlier London was compelled to be satisfied with 4,000 lamps, or something like fifteen times less number than those employed in lighting the London Metropolitan streets in this present year of 1879.

In the year 1827 a great commotion occured in the City of London, through the report that the Corporation were about giving their contract for lighting to a new company. The Independent and British Companies offered to supply gas 25 to 30 per cent. less than the other company, and to give a purer gas. The same principle appears to have actuated the Chartered in 1833, in St. James's, Westminster, who, when opposed by the Equitable, dropped their price 25 per cent. In 1847 the General Gas Act was passed, and in December, 1849, the Great Central Company prayed the Court of Sewers to be allowed to supply the City, which being allowed by deed signed on February 12th, an act was passed on July 3d, 1851, upon this condition, that the Company was only to supply the City (the district about their works at Bow being lighted by the Commercial), and never charge more than 4s. per 1,000 feet. There was a wild excitement in the City during the time the new company was battling for the favor, and squibbs were flying about in all directions. One of these is before us, and its title reads as promising as its text—"City of London Gas Bubble! The Reign of Cant and Humbug exemplified in the Career of Jeremy Diddler, late M.P. for Kennington, the Gas Philanthropist, with the Life of Haguus Scum, of Scotia, etc. By the Greatest Writer of the Age."

We have now brought our subject to modern times. The latter history of gas is well known to our readers, and gas legislation is no new thing in the acts and deeds of our Parliament houses. But, perhaps, of all the doings in connection with the companies, the great amalgamation by the Chartered Company in 1869 with other companies was the most wonderful. The late Chartered, now known as the Gas Light and Coke Company's works, at Barking Creek, must be considerably the largest in the world. The first pile for them was driven on the 19th of November, in that year, by Mr. S. Adams Beck, the governor, from whom the new home of the London gas manufacture has been named Beckton. We have been told that 250,000 yards of earth were excavated; about 90,000 cubic yards of concrete were filled in, and 40,000 cubic yards of clay puddle. There were 25,000,000 of bricks used, 50,000 cubic feet of stone, 60,000 cubic feet of timber, and 40,000 tons of iron—the total cost being about three-quarters of a million of money.

The total ground area is 150 acres, with 1,500 feet of river frontage. There are 1,080 retorts, consuming 1,000 tons of coal per day, producing 10,000,000 cubic feet of gas. The pipes, 4 feet in diameter, are carried from Barking to Westminster underground, a distance of 11½ miles; and in order to reach the works, which are in the marshes, a road was constructed 60 feet wide and about 3 miles long, to connect the old town with the new. Thus in a few words we have shown that while the company was the first, so it is now the greatest. The old gas works at Curtain-road, St. Luke's, and Whitefriars have disappeared—the Corporation of London purchasing the latter site for £170,000—and their disappearance has not been a grief to the neighborhood. We should not object to all the other company's works being removed into the marshes.

And yet, seventy years ago, who would have dreamt that the much-abused gas would have obtained such a hold of the people of London in the latter half of the nineteenth century as it has done? Dr. Johnson was a prophet when he said, "One of these days the streets of London will be lighted with smoke." What will they be lighted with a hundred—nay, a score—of years hence?

Extinguishing Fires in Tar Distilleries, Etc.

By Watson Smith, F.C.S., F.I.C.

It may not be known to all tar distillers that in cases of fire on their premises their best remedy usually lies close at hand, and this I will shortly endeavor to demonstrate from a basis of experience and fact. In the first place, however, it may be well to state that as a rule the tar distiller cannot get any fire insurance company to insure him, and it will therefore be seen that it is a matter of no light importance to be possessed of a ready and efficacious method of subduing the dread element, when it breaks out beyond its due bounds. This remedy lies in the crude ammonia water, otherwise known as gas liquor, which almost every distiller works up conjointly with the tar, and if in some cases this be not so, it would be but little encumbrance, and well worth while to obtain and keep a stock of, say, 1,000 gallons of this gas liquor.

The way in which I first became aware of the eminent extinguishing powers of gas liquors (now several years ago) is as follows:—A quantity of pitch was being run from a tar still into the pitch house, in which it is allowed to stand for some hours, to allow most of the noisome vapors to condense. By some means a flame came in contact with the vapors, an explosion occured, and in a moment the roof was blown off, and the whole mass of molton pitch ablaze. Water, though thrown on it in quantity, seemed to avail nothing, and at last the supply accidently ran short. Almost in despair, the pumps for raising the gas liquor into the ammonia stills were adjusted so as to deliver a jet of the liquor upon the fiercely-burning pitch. The expedient acted like a charm, and the fire was quickly smothered.

I think there is considerable probability that at the high temperatures attained in some fires, even the ammonia itself would be decomposed, with liberation of nitrogen and hydrogen gases, which, in addition to the volumes of carbon dioxide and steam, choke out the flame by simple displacement of air. It might be said that if hydrogen and nitrogen be so liberated together, these, together with the H_2S also set free, would do much to neutralize the effect of the non-combustible gases. Not so, however, for let there be but enough incombustible gas present, as there is, to displace the air, or to choke, by excessive dilution, the little which may remain or diffuse, then the combustible gases present, thus for the time prevented from burning, would assist in smothering the flame (being non-supporters of combustion) with as good a will, if one may use the expression, as the incombustible ones.

I would strongly recommend every tar distiller, who also works up gas liquor, to so arrange his pumping gear that he may be able to throw jets of this liquor into any part of his yard or works where fire might break out and prove disastrous. If gas liquor be not worked, then I would advise that a stock of say, 1,000 gallons be purchased. In a small works this might be advantageously stored in a tank or old boiler mounted on brickwork, at such an altitude as to give pressure enough to furnish a good jet for service below when required. Of course, this reservoir should be covered, to prevent evaporation.

Looking at the frequent occurrence of disastrous fires in cotton mills, especially those of Lancashire, I wrote some years ago to an eminent local paper, strongly recommending that the owners of cotton mills should set tanks on the tops of their mills, and furnish these with supplies of ammoniacal gas liquor, to be always ready for service.

I gave, too, a short description of the best way of arranging pipes to these different rooms.

The gas liquor itself, by careful manipulation, may be pumped off very fairly clear, and free from tarry matter.

Of course, besides to fires in cotton mills and tar distilleries, this mode of fire extinction might be all but universally applied. It may, indeed, be readily imagined how a jet of the liquor thrown into a burning room would act, the space being so inclosed, when the action is so powerful in a compartively open space, and with such a refractory substance as burning pitch.

It would seem, also, that the extinguishing power in the liquor would be even further called forth by a more intensely hot fire, for here, in all probability, the ammonia would be decomposed, and the generated nitrogen and hydrogen gases would help to swell the volume of non-supportive gas, displacing the air, and so choking out the combustion.—*Chemical News.*

Inaugural Meeting of the Central New York Gas Engineers' Association.

Pursuant to a call issued by A. C. Wood, of Syracuse, N. Y., and others, for the purpose of forming an association of engineers and superintendents of gas works in the central part of the State, sixteen gentlemen met at the Globe Hotel, Syracuse, N. Y., on May 20.

The meeting was called to order by Mr. A. C. Wood, who proposed the name of Mr. J. McDougall, of Hornellsville, as Chairman, and Mr. C. A. White, of Rochester, as Secretary,

MR. A. C. WOOD'S ADDRESS.

Mr. Wood addressed the meeting as follows:

MR. CHAIRMAN—In issuing a call for this meeting, due consideration was given to the importance of the movement, and it was done only after repeated suggestions and expressed desire on the part of several superintendents in this section of the State; and the time and place for holding a first meeting was agreed upon after a consultation with those whose names are appended to the call.

The advantages to be gained from an association of this kind are many and various. Combined knowledge and experience are an advantage in any business, and especially this of our's, where our experience is so varied at every step; and if by associating, and occasionally coming together and comparing our experiences, difficulties, and practical results we can aid each other to our mutual advantage, then our purpose will be gained.

That associations of this kind are of advantage has been exemplified to those of us who are members of and have been in attendence at the meetings of the American Gas Light and kindred associations, and to others who have read their proceedings as published in the AMERICAN GAS LIGHT JOURNAL. That these meetings are of value and importance is testified to by the gas light companies of the country, whose officers compose the American Gas Light Association, and if of importance to them, as companies, how much more important to us, who have all things appertaing to the manufacture to work out in detail.

The formation of associations of this kind and the meeting together for consultation over gas matters, is no new thing, as it was done years ago, although not to the extent that has now been developed. The first organization of the kind in this country that has come to my knowledge, was at a meeting called by Mr. Chas. Roome, President of the Manhattan Gas Light Co., of New York, held in the city of New York Nov. 21, 1859. The call was issued to the gas light companies of the State. Wm. W. Fox, President of the New York Gas Light Co., was chosen President, Theordore W. Parmele, Secretary.

The Secretary was employed in making analyses of coals, tests with oils, water, tar, wood, and other materials for making gas; also in testing new machinery, apparatus, and processes for manufacturing and manipulating gas. He was provided with a complete chemical and experimental apparatus, located at the 18th street station of the Manhattan Gas Works.. His reports were to be sent out to each gas company in the State belonging to the Association. Another object of the Association was for mutual protection against unjust legislation at Albany.

But few gas companies joined the Association, and it was abandoned after a few years existence. Among the companies who were members of that Association were the Utica Gas Light Co., represented by Mr. H. H. Fish; Syracuse Gas Light Co., represented by Messrs. E. W. Leavenworth and Allen Munroe; Rochester Gas Light Co., respresented by our late lamented friend, Geo. W. Parsons; and Buffalo, by O. G. Steele. Canandaigua and Geneva were also represented at the meeting for organization, which was held Dec. 15, 1859.

In Great Britain the following associations have been formed:

1862. North British Association of Gas Managers.
1862. Waverly Association of Gas Managers.
1863. British Association of Gas Managers.
1871. Manchester District Association of Gas Managers.
1873. West of Scotland Association of Gas Managers.
1875. Southern District Association of Gas Managers.
1877. Norhern District Association of Gas Managers.
1877. Midland Association of Gas Managers.

The next movement toward concerted action of the gas companies of Central New York was in accordance with a resolution passed by the board of directors of the Gas Light Co. of Syracuse, at a meeting held April 11, 1864, as follows:

"*Resolved*, That the secretary of this board be and is hereby instructed on behalf of the board, to invite the respective gas light companies in Central New York to be represented at a meeting to be held at the office of the Gas Light Co. of Syracuse, on Tuesday, the 24th day of May, inst., at 11 o'clock A. M., (15 years ago), to consult in relation to the price of gas, and such other matters of general interest as may come before the meeting."

The following companies were represented: Utica, Rome, Fulton, Birmingham, Geneva, Auburn, and Syracuse. A very interesting meeting was held. Although no formal organization was entered into, it was agreed and understood that the meetings were to be continued, and was adjourned subject to the call of Mr. Leavenworth, or at the request of any of those present. But no subsequent meetings were held.

The call for the first meeting of the American Gas Light Association was signed by P. E. De Mill, Detroit; E. G. Watkins, Chicago, and H. Montgomery, of Rochester, and the meeting was held in the city of New York April 16, 1873, at which 24 gas companies were represented, from 14 different States. Central New York was represented at this and the first annual meeting of the Association, which was held in October following, by delegates from Rochester, Oswego, and Syracuse.

From this it will be seen that the gas light companies of New York have taken an interest in all of these movements for mutual improvement.

The New England Association of Gas Engineers has been in operation for a few years. They meet February and August each year, with the best results. The New England Gas Engineers Club meet once each month at different places, thus visiting each other's works, at which times interesting papers are read, and discussions follow, to the advantage of all.

The Society of Gas Lighting is composed of some of the engineers and superintendents of the works in New York and vicinity. They also meet once a month, at different works designated at a previous meeting of the Society. Gen. Roome and engineer Smith, of the Manhattan works, inform me that these meetings are of a most interesting character, and productive of much good to all. Each learns from the others improvements and advantages to be gained in the workings of the various departments of their respective works.

The Western Association of Gas Engineers and Superintendents was organized at St. Louis on the 18th of September last. They hold meetings annually in May, and are migratory. It will be seen that these associations are multiplying, and no doubt more will be formed in many localities easy of access to a minimum number of companies where they can frequently congregate.

But it is urged that the formation of these associations will detract from the interests of the American Gas Light Association. My own opinion is that it will to the contrary not only strengthen but promote an increased interest in that association That is an organization of the officers of gas companies who meet but once in 12 months. This is to be an Association of Engineers and Superintendents who are in the main responsible for the success of their respective works, and who propose to come together for consultation more frequently, and give our presidents and directors the advantages in detail which we gain at these frequent meetings, they in turn can report them to the National Society, thus promoting its interests and usefulness; and too the expense of time and money, as well as the inconvenience of traveling to a distance, has detered many from joining that Association, and but few of the 27 companies in Central New York are members of it. By confining the membership to one section of the State there will be comparatively little travel and expense in attending the meetings, and no doubt the benefits and experiences obtained in this way will prompt many who have not heretofore done so to join the American Gas Light Association.

Perhaps some will be deterred from joining this, as they have the general Association, from the fact that their works are small and their operations limited: the more need for them to profit, if possible, from those of larger experience; for we all, large and small works, have the same manipulations to go through with, the same difficulties and vexations to encounter, and the same ends to gain, the same capricious public to deal with, and cheap oil to compete with, and there is no one, however limited his experience, but has gained a point in some direction which will assist others who have encountered the same difficulties, or who desire to take advantage of improvements or ideas that may be mentioned. Gen. Roome says: "The most valuable ideas are sometimes obtained from the humblest workman, whose means of observation may be greater than that of the engineer in charge."

It is for us to determine as to whether an organization shall be perfected, its territory be confined within the limits named in the call or be extended, the time and place of meeting, and also as to membership, officers, &c., all of which can be provided for in articles of association, if it is concluded to organize an association.

On a motion of Mr. Higgins, of Rome, the following constitution and by-laws were adopted:

CONSTITUTION AND BY-LAWS.

WHEREAS, The manufacture and supply of gas has become one of the largest economic interests of the country; it is, therefore, most important, that the best known processes shall be employed in its manufacture and distribution, and to this end it is desirable to obtain the advantage of the experience of the engineers in the central portion of this State, upon the various questions arising for consideration; therefore, we, the undersigned,

do hereby agree to associate ourselves for the above-named purpose, and to be governed by the following

CONSTITUTION.

ARTICLE 1. The name of the Association shall be THE CENTRAL NEW YORK GAS ENGINEERS ASSOCIATION.

ART. 2. The objects of this Association shall be the promotion and advancement of knowledge, scientific and practical, in all matters relating to the construction and management of gas works, the manufacture, distribution and consumption of gas for illuminating and other purposes.

The inducement and extension of more cordial and friendly relations between the manufacturer and consumer, their interests being mutual.

ART. 3. Any gas engineer, superintnndent or person actively engaged in the management of gas works, within the boundaries hereinafter named, may become an active member of this Association, upon application in writing to the Secretary, addressed to the Association, and an election by two-thirds of the votes at any regular meeting of the Association and signing this constitution.

Any person connected with the manufacture of illuminating gas may become an honorary member by the same vote as is required for the election of active members.

ART. 4. The regular meetings of the Association shall be held quarterly on the third Thursday in February, May, August and November, of each year, at such place and hour as shall be directed at the previous meeting; but special meetings may be called by a majority vote of the board of Directors at such time and place as the best interests of the Association may demand.

ART. 5. The officers of the Association shall consist of a President, two (2) Vice-Presidents, a Secretary and Treasurer, who, with five (5) members of the Association, elected for the purpose, shall constitute a board of Directors.

ART. 6. The administration of its affairs shall be entrusted to the officers of the Association, of whom four (4) shall constitute a quorum for the transaction of business.

ART. 7. The Secretary and Treasurer shall receive all money; he shall also notify members of all meetings; he shall take minutes of all proceedings of the Association and record them in proper books for that purpose. He shall conduct the correspondence of the Association; read the minutes of all meetings, also papers and communications, if the authors desire it, and perform such other duties as may be required by the constitution appertaining to his department.

ART. 8. The duty of the remaining officers shall be such as is usually performed by officers of a like character in similar Associations.

ART 9. At any regular meeting of the Association ten (10) members shall constitute a quorum for the transaction of business.

ART. 10. All questions shall be decided by any convenient system of open voting, the chairman to have a second or casting vote when necessary, questions of a personal nature shall be decided by ballot.

ART. 11. All papers read at the meetings of the Associations must relate to matters directly or indirectly connected with the manufacture, distribution or consumption of gas, and must be approved by the board of directors before being read.

ART. 12. All papers, drawings or models, submitted to these meetings, shall remain the property of the authors.

ART. 13. If any person proposed for membership, on being balloted for, shall be rejected, no notice shall be taken of the proposal in the minutes.

ART. 14. Active members shall pay an entrance fee of three dollars, and shall be liable to an annual assessment of two dollars, which shall be paid at or before each annual meeting; and no member whose annual payment is in arrears shall be entitled to vote.

ART. 15 The boundary of the Association shall be all that portion of the State from and including Utica, west to the State line.

ART. 16. The annual meeting of this Association shall be held on the third Thursday in May of each year.

ART. 17. The constitution may be altered or amended at any annual meeting, notice of such change having been given to the board of directors at least one month prior to such meeting.

RULES OF ORDER.

At a regular meeting of the society the order of business shall be—

1. Reading of minutes.
2. Proposals for membership and balloting for the same.
3. Reading communications.
4. Reports of committees.
5. Unfinished business.
6. Reading of papers and discussion on same.
7. General business.

On motion of Mr. Cartwright, of Oswego, a committee of three, consisting of Messrs. Wm. Cartwright, of Oswego, A. D. Perry, of Rochester, and A. J. Avery, Dunkirk, were appointed to report permanent officers of the Association.

On motion of Mr. A. C. Wood, it was decided to have dinner at one oclock; visit the gas works at five o'clock; and then partake of a lunch, to be prepared on the "Sun Dial" gas stove.

The committee on permanent officers presented the following names:

President—Austin C. Wood, Syracuse.
First Vice President—John McDougall, Hornellsville.
Second " —Wm. Cartwright Oswego.
Secretary and Treasurer—Clem. A. White, Rochester.

Directors—

A. D. Perry, Rochester.
D. M. Dunning, Auburn.
W. A. Fish, Utica.
J. D. Higgins, Rome.
F. D. Kingsbury, Corning.

who were all elected and declared as officers for the ensuing year.

Mr. Higgins gave a description of a check-plate, used by him for a number of years, to overcome stoppages in stand pipes, and that the result had been an entire freedom from stoppages.

In charging his retorts the coal was thrown well back, leaving a space of two feet back of the check-plate on which no coal was placed. He had thereby realized also an increased yield, without loss in candle power, and did not perceive any increase in the deposit of carbon.

Mr. Wood and Mr. Cartwright referred in favorable terms to Mr. Higgins's plan.

On motion, the meeting adjourned to meet at two o'clock.

The Association was called to order, pursuant to adjournment, A. C. Wood in the Chair.

The President made some remarks on the subject of the competition of oil; heretofore the gas companies had not solicited consumers but had kept on in the even tenor of their way. The oil men came in direct contact with the people, put up their lamps, and personally sought trade; they had opened the way for the gas companies, and we should solicit trade. Recent experiments had demonstrated the fact that a burner consuming 2½ ft. per hour, of 16 candle gas, gave a light equal to a kerosene lamp; and, at the rate of $2.50 per thousand cubic feet, could be furnished as cheaply. As we used different coals in our manufacture, our results would vary accordingly; and each company should select the burner best adapted to the gas furnished by them, and furnish them to their consumers.

Quite a free interchange of opinion on this subject was indulged in, remarks being made by Messrs. Perry, Cartwright, Parrish and White.

On motion of Mr. Parrish, the Secretary was instructed to procure the necessary books and stationary for use in his office.

On motion of Mr. McDougall, it was agreed that when we adjourn we adjourn to meet at Rochester, on the third Thursday in August, 1879.

The Secretary read the following telegram from Major Dresser, Editor of the AMERICAN GAS-LIGHT JOURNAL:

NEW YORK, May 20, 1879.

A. C. WOOD, *Globe Hotel, Syracuse*—

May your deliberations be crowned with success. Impossible to attend.

GEORGE W. DRESSER.

On motion of Mr. White, the AMERICAN GAS LIGHT JOURNAL was recognized as the official gazette of the Association.

On motion, the meeting adjourned.

A. C. WOOD,
President.

Attest.

C. A. WHITE, *Secy. and Treas.*

LIST OF MEMBERS.

John McDougall	Hornellsville.
John D. Higgins	Rome.
F. D. Kingsbury	Corning.
P. Clark	Oneida.
Wm. Humphrey	Dansville.
Austin C. Wood	Syracuse.
J. S. Bull	Cortland.
D. M. Dunning	Auburn.
W. A. Wood	Syracuse.
Wm. Parish	Seneca Falls.
R. J. Dobson	Seneca Falls.
Clement A. White	Rochester.
A. D. Perry	Rochester.
Wm. Cartwright	Oswego.
A. J. Avery	Dunkirk.
Geo. Rider	Norwich.
W. P. Fish	Utica.

[From the "Journal of Artificial Light."]

West of Scotland Gas Managers' Association.

The annual meeting of the West of Scotland Gas Managers Association took place at Coatbridge on Friday, 25th April, 1879. Mr. S. Stewart, engineer, Corporation Gas Works, Greenock, president of the Association, occupied the chair.

The Secretary—I may state that £33 odds of arrears I consider good. If members in arrears would pay up their subscriptions the association would be in a much better position than at present.

Mr. Niven (Dunoon)—Does that include what is to pay to-day, or only what is due now?

The Secretary—Partly what is due to day.

The President—It is of no use burdening the list of members with the names of those who no longer take an interest in the Association. We have therefore struck their names off. This is unfortunate, but it must happen with all associations.

Mr. Mitchell (Coatbridge)—I daresay it will be within the memory of most of those present to-day that at the last annual meeting I drew attention to the fact that many members were in arrears. At that time I further said that a considerable amount of our secretary's time was occupied by attending to such details, while his other duties were very onerous. It was therefore in his interests, and in the interests of the Association, that I proposed the motion which I now formally repeat: "That a committee be appointed with full power to draw up a list of those in arrears, and that the committee should have full power to strike off from the roll of membership the names of those parties who have been two years in arrear with their arrears."

Mr. Renfrew seconded the motion, which was agreed to.

ELECTION OF OFFICE-BEARERS AND COMMITTEE.

The following gentlemen were elected as office-bearers of the Association for the ensuing year: President, Robert Mitchell, gas manager, Coatbridge; Vice-President, Robert S. Carlow, gas manager, Port Glasgow; Secretary, Samuel Dalziel, gas manager, Kilmarnock; Treasurer, Wm. Smith, gas manager, Helensburgh; Auditors, Samuel Black, gas manager, Alexandria; Levi Monk, gas manager, Lanark. Committee, Samuel Stewart, gas manager, Greenock; Wm. Young, Clippens Shale Oil Works, Paisley; James M'Gilchrist, gas manager, Dumbarton; Duncan Jeffrey, gas manager, Kirkintilloch; Wm. Fairweather, gas manager, Barrhead; James Renfrew, gas manager, Langbank; John Fullerton, gas manager, Motherwell; John Adams, gas manager, Pollokshaws; and John Johnston, gas manager, Hamilton.

[To be continued.]

North of England Gas Managers' Association.

The Fourth half-yearly general meeting of the North of England Gas Managers' Association was held on Saturday, April 26, in the offices of the Newcastle and Gateshead Gas Company, under the presidency of Mr. Hepworth, of Carlisle.

The Chairman, delivering the usual address, said that the period which had elapsed since their last meeting had been characterised by unexampled activity in their profession, activity which he regarded as being of the most healthful and promising character—activity, perhaps, not arising from any actual extension of gas works, or, in such times of commercial depression, any considerable increase in the demand made upon them for gas—but activity which had arisen in the way of developing the commercial changes of their busines; while improvements in the manufacture have not been overlooked. On the date of their last meeting the scare occasioned by the electric light had not passed away, and gas properties stood at a considerable discount. Gas property had since regained its value, and many of those who helped to increase the alarm by disposing of their property had by that act of their own been made to suffer the penalty of their senseless fears. But during this period what had taken place? They had not only had exhibitions of the electric light, which had been quite sufficient to convince them of this—that the electric light was unreliable, and helped to transfer the question to the consideration of the committee of the House of Commons, where he for one was prepared to leave it for the present—but they had had exhibitions of another character. They had one continuous exhibition of a somewhat different character—one continuous exhibition of the advantages and utility of gas not only for light but for other domestic uses—cooking, heating and so on. They had it illustrated in several ways; by the introduction, for instance, of vastly improved gas burners, and burners specially adapted to street lighting. They had been exhibited in Newcastle, he knew, in London, and indeed in all the centres of men from London to Aberdeen. These improved burners had been placed, in London, side by side with the electric light, and it was very late news to say to them that the general impression was that they competed most successfully with anything offered them in the way of the electric light. A more comfortable, pleasing, and thorough lighting he never witnessed than that which was to be seen in the vicinity of the Mansion House on the improved burners. Not only in burners but in respect to the several appliances to which he had adverted, the use of gas in cooking and heating, had been more numerously illustrated, perhaps during the last six months than during any previous period. When in Leeds he saw an exhibition now being held there, and he bore a message from the engineer of the gas works there who sent kind expressions of regard to the Association, and hoped that many of them would avail themselves of an opportunity to see that exhibition. Though not so large as some exhibitions held, it was yet, he thought, as perfect a one as they could desire. Further than that, a very practical exhibition had been held and was being held, and only in another town in which he had some acquaintance in the Midland counties. That town was passing through now the greatest amount of commercial distress which had ever characterized that city, it having previously passed through seasons of similar distress owing to this change of fashion affecting their trade. In that town they had undertaken to cook by gas the meals of any one sending them to be cooked. The privilege was being largely used by the public and the result, which would interest them, struck him very forcibly. Notwithstanding the great depression to which he had adverted—a depression which had lasted now over nine months in a very severe form—the increase in the gas delivered from these works during the last six months had amounted to no less than ten per cent. He might remark here with regard to the Parliamentary powers sought by several companies and notably in this district, he had wished in the past few years that power were sought to manufacture or loan the use of gas stoves and other appliances of that characte. He thought that that was a wise provision, and he hoped that Parliament in all cases would grant it. He should like the powers sought for to have been greater even than this; in addition to supplying this apparatus he should have liked gas companies to have sought the power to control the supply of gas to the burner, because they must all be convinced of the waste which arose from inefficient fittings, all of which could be remedied if they were under proper surveillance. He had said that gas makers had also been active in another direction. Efforts had been doubled recently in all matters respecting the manufacture of gas, and some of the most amazing results had been reached. He saw some works the other day where the average make of gas per ton exceeded 10,500 cubic feet, and when the make per mouthpiece was positively approaching 8,000 cubic feet. He could credibly inform them of another works where the gas was said to reach no less than 10,300 feet per ton. They knew the significance of these figures; the mere mention of them without going into the causes by which they are brought about was enough to make them not only to relax, but to put forth every possible effort to attain to such results as those to which he had referred. It was not to be wondered at, therefore, that the prosperity of gas undertakings continued to grow; and so long as companies and corporations went on as heretofore, seeking to perfect their manufacture and sharing their prosperity with their consumers by lowering the rates of payment so long they might anticipate a continuance of this prosperity, notwithstanding the introduction of any other artificial light. Meeting, as they did, in the metropolis of the coal district, they could not but think of that great strike which, he supposed, must already have paralyzed the staple trade of this neighborhood. Knowing the questions underlying this contest between capital and labor, it was not for him to express an opinion as to the bearings of the matter.

But they could not be utterly indifferent to a matter by which the supply of their staple material was largely interfered with, and though it would not seriously inconvenience themselves personally, they could not but regret that the circumstances were such as to institute a struggle of the charter and magnitude of that to which he referred.

It was to be hoped that the questions at issue would speedily be settled by the arbitrament of reason, which ought to be the only lasting and satisfactory solution sought after.

A strike which affected their industry even closer than that to which he referred was that just terminated in Barcelona, where the local authorities imposed a tax on the consumption of gas, and where the consumers refused to burn taxed gas, and ultimately, as he had indicated, came off victorious in the struggle.—*Journal of Artificial Light and Sanitary Gazette.*

How a Crevasse is Made.—The way in which a flood acts upon a bank of ordinary earth is peculiar. As soon as the water has washed below the surface, it begins to filter through the bank, and soon appears at the other side, first as a mere weeping, which gradually grows into a rivulet, then into a stream, and finally into a torrent which sweeps the whole bank away before it. It is clear, however, that there is always some time given for the defense of the breach, even after the attack has declared itself. If the weeping can only be checked as soon as observed, no further results will follow. The difficulty is that the leak must be stopped at the inside of the bank.

The Bye-Products of the Distillation of Coal.*

Read at the Conference du Trocadero, Paris Exposition.

By Prof. Bertin.

In attempting to collect the principal facts which go to prove that in a perhaps not far distant future the main object of the destructive distillation of coal will not be the manufacture of illuminating gas, then becoming merely accessory in its character, but rather the bye-products, I am well aware that the task which I have undertaken is difficult and arduous, following, as I do, so many eminent men who have preceded me in this course. But I hope to be able to count upon your kind indulgence in return for a good intention.

Coal, you are well aware, is employed—

1st. In heating apparatus, for elevating temperatures.

2d. In the furnaces of boilers, in order to obtain power; this means transforming heat into mechanical force.

3d. In the manufacture of illuminating gas.

I propose to discuss exclusively the residues obtained at the gas works in the distillation of coal. These residues are known under the name of bye-products from coal, the main product being the gas.

I ought to premise immediately that it is not my intention to describe the several processes of manufacture; time, in the first place, does not permit it, and then again I do not think that I ought place myself in this purely industrial point of view. Without entering into technical details, I merely wish to confine myself to general facts, such as will permit me to make clear to those who have not made it a special study, by what series of operations we have succeeded (permit me to use an expression which belongs perhaps to rhetoric rather than to science, but which admirably expresses my thoughts,) in dyeing linen or silk by means of a piece of coal; and in order to impress these ideas, so that we may know whence we start and where we are going, I shall show you our actual starting point, and what our goal will be.

In the course of our undertaking we shall have to speak of the aniline colors. Most of them can be dissolved in water, and it requires, as it were, but an infinitesimal quantity to color the water in this glass. Here is the aniline blue; this vial holds but very little, but this is quite sufficient to produce a color whose purity and brightness will astonish you, if you are not acquainted with it already. Well, this piece of coal is the beginning, this product is the end. Let us try to pass from one to the other.

The elementary constituents of coal are, properly speaking, those of the vegetation which gave rise to the coal formation, *i. e.*, the elements of organic nature—carbon, hydrogen, nitrogen, oxygen, sulphur, and water, and hence we ought to find nothing else in the distillation of coal. The analysis of coal, however, does not permit of an exact determination of its elementary constitution; it is necessary, generally, to confine ourselves to averages, since it is not unfrequent that, in analysing successively two pieces coming from the same block, differences of more than 5 per cent. of carbon are found. Coal, finally, like all bodies of vegetable origin, owing to the weak resistance which organic compounds offer to the action of external forces, is a body which can readily be decomposed.

The distillation of coal yields a fixed product, coke, and volatile products which, upon cooling and condensation, become separated on the one hand into ammoniacal liquids and oleo-resinous matter (tar), and, on the other, into permanent gases. The latter constitute the illuminating gas which was made the subject of a previous conference, and upon which, therefore, it is not necessary to touch. The coke remaining in the retorts, and of which you here see one of the finest of specimens, has the swollen appearance so well known to you; this has its origin in the fusion of the bitumens and the escape of the disengaged gases and vapors.

We will see presently how not one of the residues in the manufacture of coke, and hence in the distillation of coal, is lost, but finds a good application; how the immense heaps of coke dust remaining at the gas works, which, with the tar, were regarded formerly and for a long time as useless and cumbersome substances, are now being utilized.

Upon leaving the distilling apparatus, coal gas passes through chambers filled with water spray, where it is purified by abandoning successively those substances which are detrimental to its illuminating qualities, and whose disagreeable odor, at the same time, would not permit of its use. The water of condensation mainly consists of the carbonate, sulphide and chloride of ammonia.

In certain cases, depending upon the location and arrangement of the works and the facilities for transporting and removing the products, it is found convenient to use this ammoniacal liquor as a liquid fertilizer on fields and meadows. Generally, however, it is used in the manufacture of sulphate of ammonia, which at the present time is probably the only ammoniacal salt successfully employed as a fertilizer. The Paris Gas Company manufactures sulphate of ammonia in a state of great purity; it sells it at a comparatively low price, and is unable to satisfy the demands which are made upon it by farmers, to whom only it sells this product. Do not consider these few words an advertisement for the company, which certainly does not require any. I feel bound to say, in passing, publicly and to its praise, that it endeavors in a way to be useful to agriculture; it does not sell its product to everybody, and it does this solely in order to prevent the sulphate from being adulterated with foreign bodies before use.

The ammoniacal liquor, finally, is employed in the manufacture of ammonia, with whose penetrating and disagreeable odor you are acquainted. The caustic ammonia of commerce possesses at times an amber color, due to a change in the organic substances which come in contact with it. To purify it, it suffices to distill it with slaked lime, and it is then obtained absolutely clear, as you may judge from these two specimens. Here is the amber colored alkali; here it is distilled in presence of slaked lime.

In medicine ammonia is employed as a caustic. You also know, or rather you have heard it stated, that when administered with care—several drops in a glass of water—it is a powerful means of combating alcoholic inebriateness. Ammonia, finally, is one of the principal reagents employed in the chemical laboratory.

We have now come to the most extensive as well as the most interesting part of our subject: I propose to discuss the coal tar.

In distilling coal, temperature plays a great role in the production of the tar, whose density is greater or less than that of water, according as the temperature was high or low. The quantity is greater the more progressively and gradually it is heated. Upon leaving the condensing apparatus, the tar is conveyed into large cisterns, where it is left alone until it shall have separated from the ammoniacal liquor which accompanied it. Until within the last few years, great difficulties were experienced in depriving the gas of tarry compounds which escaped the action of the cooling apparatus. You can see to-day, at the Exposition, a very ingenious condenser, designed by MM. Pelouze and Audouin. The gas here passes through a series of holes, .025 inch in diameter, and is projected upon an inclined plate; the flattening of the globules, their intimate contact, and finally their re-union in a liquid mass, are the result of the successive shocks to which these globules are subjected. Before entering the apparatus, the gas presents a blackish appearance; it leaves it perfectly colorless, and the tar flows off in a steady stream.

Coal tar is one of the most complex of substances. When distilled, the portion which goes off below 300° C. is composed of three groups of bodies: various carburets of hydrogen, organic bases and acids; and the industrial treatment of tar consists precisely in separating the bases and acids from the carburetts. The first products in the distillation of tar are the heavy and the light oils, the residuum constituting a very hard, black, and bright mass called pitch. We will presently return to the heavy and the light oils of tar; let us first see how the pitch can be utilized, so as not to pass a single bye-product without noting the uses to which it might be put.

Pitch is used in making artificial fuels. Besides our natural fuels, there are in use various artificial combustibles, which are made by mixing waste products of every kind with some cementing substances. This constitutes the manufacture of artificial fuels, which are known more generally under the name of "Briquettes," a specimen of which you see here. Crude tar and pitch are the only cements which have answered in practice, and they are still used.

A good fuel should fulfill several conditions; it should be but little hygroscopic, and devoid of all odor; should fire readily. without deflagration, and finally should leave but 7 to 10 per cent. of ash.

The manufacture of *briquettes* in France exceeds annually 700,000 tons, and is still less than the total consumption: the railways are obliged to depend, to some extent, upon England and Belgium, and the same is true of the French navy, which also uses them. I need not describe the processes in use for the manufacture of briquettes, upon which you can readily inform yourselves by obtaining permission to visit the tar works at La Villette—a visit quite interesting, even to ladies, who may rest assured of finding there a plot of ground which, in point of cleanliness, may perhaps rival, I would almost say, many of their parlors. You will there see that coke dust, which until within a few years ago was so cumbersome, now utilized in the manufacture of briquettes. It is mixed with crushed pitch, is passed through sieves, and, after having been put into the mills, is subjected to a pressure of 1,400 pounds per square inch.

[To be Continued.]

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*Translated from *Journal des Usines a Gaz* by A. P. Trautwein.

Owing to the fact that a large number of the heaviest taxpayers of Quincy, Ill., refuse to pay their city tax, claiming the per cent. to be in excess of the amount allowed by the charter, the Mayor of the city has notified the gas and water companies that there is no money to pay them, and that they must look out for themselves if they continue the supply.—*Engineering News.*

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MONDAY, JUNE 2, 1879.

Official Report of Examinations of Gas for two Weeks ending May 24, 1879, made at the Photometrical Room of the Department of Public Works.

Corrected Illuminating Power.

May. 1879.	Time of Day at which Test were made.	New York Gas Light Co.	Manhattan Gas-Light Co.	Mutual Gas-Light Co.	Metropolitan Gas-Light Co.	Harlem Gas-Light Co.	Municipal Gas-Light Co.
12	Between 9.30 A.M. and 1 P. M.	16.92	17.30	18.78	16.82	16.87	
13							
14		16.74	17.13	18.66	17.51	17.03	
15		16.81	17.40	18.73	17.57	16.74	
16		16.52	17.21	18.39	17.51	16.47	
17		16.73	16.87	19.23	17.14	15.92	
	Average	16.74	17.18	18.76	17.31	16.60	
19		16.16	16.68	18.01	16.85	16.32	
20		16.58	16.97	19.32	17.10	16.09	
21		16.48	17.42	18.81	16.80	15.54	
22		16.54	17.91	18.05	17.36	15.49	
23		16.24	17.27	18.38	17.59	15.60	
24		15.59	17.09	18.76	16.82	16.00	
	Average	16.26	17.22	18.55	17.08	15.84	

Sugg-Letheby burner.
E. G. LOVE, Gas Examiner

Lime Cartridges.—Unslaked lime may be substituted for powder in quarries if it is compressed into cartridges, placed in the drill holes, and then saturated with water. By using these cartridges in coal mines there is less waste from small coal than when ordinary powder is used, and there is less danger of accidents from the flying fragments and from vitiated air.—*Fortsch. der Zeit.*

OUR EXCHANGES.

United States.

[*Engineering News.*]

The erection of the New South Wales exposition building will be carried on at night by electric light.

It is said that there are 17,000 houses in Philadelphia in which gas is not used. The *Record* says gas should be furnished at $1.50 per thousand feet in that city, but it costs $2.15.

The results of turning town sewage into rivers and other waters are serious, as is shown by the fact that vessels going down the river Thames have in many places to leave the channel in order to avoid the enormous banks of sewage that have been formed on the bed of the river. These banks are in some places from ten to fifteen feet in depth.

An English item says: "The electric light is found to be adapted to one very useful purpose, viz., facilitating the construction of works on tidal rivers, when there are only a few hours between the tides in which the men can work. These few hours necessarily occur sometimes in the middle of the night, and the provision of the electric light greatly expedites operations. The light is now thus in use on the works of the Severn Bridge Railway."

English gas directors are in good spirits again. The electric light is found to be very expensive. At a late meeting of the London Gas Light Co. and the Phœnix Co. the chairman stated that the recent experiments in London had been greatly to the advantage of gas; the cost of the electric light had been 7½ times as much as gas light, and even if the electric light were greatly developed there would still remain a large field for gas business.

American Society of Civil Engineers.

The eleventh annual convention of the Society will be held at Cleveland, beginning Tuesday, June 17.

Sessions for the consideration of professional subjects, and one for the transaction of business will be held. The details of the programme will be announced as soon as determined by the local committee.

Members of the Society are earnestly requested to furnish information or memoranda upon any of the subjects announced. They are also invited and expected to take part in the discussions, either in person or by sending to the Secretary notes for presentation.

In either case, it will assist the committee in arranging the details for sessions of the convention if members expecting to take part in the discussions will notify the Secretary at once to that effect.

Invitations to visit Pittsburgh and the government works for the improvement of the river at that place (Davis Island Dam), have been extended by James H. Harlow, member of the Society.

Please notify the Secretary whether you will visit Pittsburgh, and whether you will present a paper or take part in the discussions at Cleveland.

JOHN BOGART,
April 30, 1879. Secretary.

The First Steel Bridge in America.—Arrangements have been concluded by Gen. D. D. Smith, Chief Engineer of the Chicago and Alton Railway, for constructing the first all-steel bridge in America. Gen. Smith will be remembered by his connection with the U. S. Government Board for Testing the Strength of Iron and Steel, experiments which were carried on by him several years ago. His researches have at last brought him to the conclusion that steel bridges can be built cheaper than iron, and be equal in durability. The bridge will be erected over the Missouri river on the Chicago and Alton Railway. It will be of five spans of 350 feet each. The elevation over high-water mark will not be less than 80 feet, at which height the light steel rods of the "Howe truss" will look like silver cobwebs glimmering in the sunshine. For all its frail appearance, the bridge will have a strength reached by but few existing structures in the world. The total amount of steel used in the construction will be about 1,500 tons, equivalent to almost double that quantity of iron.—*Am Journal of Industry.*

Price of Gas in Youngstown, Ohio.—The Youngstown Gas Co. has reduced the price of gas as follows, to take effect June 1, 1879: Monthly sales of less than 5,000 feet, $2 per thousand; monthly sales of 5,000 feet and over, $1.75 per thousand.

Prices of Gas Coal.

Penn and Westmoreland	$4.50	at New York.
" "	3.50	at Baltimore.
" "	3.75	at Philadelphia.
Despard, Newburgh Orfel, Murphy Run, Fairmont	4.25	at New York.
	530	at Baltimore.
Chesapeake & Ohio	4.50	at New York.
" "		
Newcastle	3.25 to 3.50	
Provincial	3.50 to 3.75	
Cannelton Cannel (by cargo)	8.50	at New York.
Ince Hall	7.25	

The above prices are about $1 per ton below those of 1878.

Gas Stocks.

Quotations by G. W. Close Jr., Broker and Dealer in Gas Stocks.
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JUNE 2, 1879.

☞ All communciations will receive particular attention
☞ The following quotations are based on the par value of $100 per share.

	Capital.	*Par.*	*Bid.*	*Asked.*
Gas Co.'s of N. Y. City.				
Central	466,000	50	60	75
Harlem	1,800,000	50	40	45
" Bonds	170,000			103
Manhattan	4,000,000	50	177	183xd
Metropolitan	2,500,000	100	122	126
" Scrip	$1,000,000	..	99	103
Mutual	5,000,000	100	65	75
" Bonds, gold	900,000	1000	98	103
Municipal	1,500,000	100	110	117
" Bonds	750,000		95	100
New York	4,000,000	100	95	100
Nothern	270,000	50	—	100
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	125	130
Citizens	1,200,000	20	60	65
" S. F. Bonds.	320,000	1000	100	102
Peoples	1,000,000	10	20	30
" Bonds	325,000	...	--	95
" Scrip	300,000	...	75	80
Metropolitan	1,000,000	100	60	65
Nassau	1,000,000	25	70	75
" Ctfs.	700,000	1000	90	95
Williamsburgh	1,000,000	50	70	75
" Scrip		...	90	95
Kings Co	200,000	100	—	70
Union Co. E. N. Y.		25	—	50
Richmond Co., S. I.	300,000	...	60	85
Out of Town Gas Companies.				
Bath, Maine	70,000	100		
Buffalo Mutual, N.Y	750,000	100	65	70
" Bonds	200,000	1000	95	100
Baltimore, Md	2,000,000	100	95	98
" Ctfs., gold	1,000,000		95	10
Bayonne, N. J		100		90
Brockport, N. Y	25,000	100	...	80
Citizens, Newark	918,000	50	100	103
" " Bds.	124,000	—	105	10

Chicago Gas Co., Ills			128	130
Cincinnati G.& C.Co.				190
Derby of Conn.....	160,000	100	60	80
East Boston, Mass...		25	114	120
Elizabethtown, N. J.	300,000	20	—	130
Fort Wayne, Ind.....		100	...	—
Hannibal, Mo.....	100,000	100	95	100
Hartford, Conn.....	700,000	25	120	125
Hempstead, L. I.....	25,000	100	...	—
Jersey City	750,000	20	145	155
Jamaica, L. I.....	25,000	100	...	—
Jacksonville, Ill.....	120,000	50	100	...
Lewistown Maine...	400,000	100	70	80
Lima, Ohio,.....	60,000	100	—	...
Bonds	30,000		90	
Laclede St Louis Mo.	1,200,000	100	—	75
Long Branch.....		20	30	40
New Haven, Conn...		25	136	152
Peoples, Jersey City		...	—	80
" " Bds.				95
Peoples of Albany...	650,000	100	—	10
" Bonds	350,000	1000	—	—
Peoples of Baltimore		25	44	48
" Bonds....			106	—
Plainfield, N. J.....	80,000	100	—	105
Perth Amboy		25	—	95
Rochester, N. Y.....		100	70	80
" Citizens		100	50	60
Toledo, Ohio.....			95	97
Washington, D. C...	1,500,000	20	190	200
" Scrip	500,000	20	100	—
Yonkers.....		50	70	80
Woonsocket, R. I....	150,000	100	80	...
Halifax N. S.....	400,000	40	148	150
Hamilton, Ontario...	150,000	40	117½	
Pittsfield, Mass.....			120	130
Rondout & Kingston			75	80
St. Louis, Missouri..	600,000	50	73	75
Stillwater, Minn.....	50,000	50	—	26
Saugerties, N. Y....	15,000	100	95	100
Troy, Citizens..	600,000	100	—	60
San Francisco Gas-Co., S. Fr'isco Cal.			95	95¼

The Manhattan gas company has declared a dividend of 5%, payable June 2d. The following sales were made at auction since last report: 200 shares Williamsburgh, at 75; $5,000 Williamsburgh scrip, at 90; 36 shares Manhattan, at 181½; 322 shares Jersey City, at 145½–146, 168 at 144, and 9 at 152½; 18 shares Metropolitan, at 127¼; 37 shares New York, at 98.

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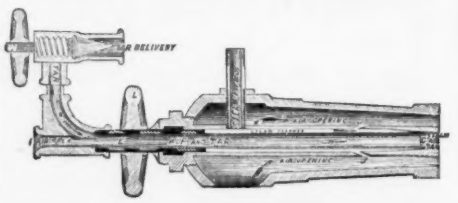

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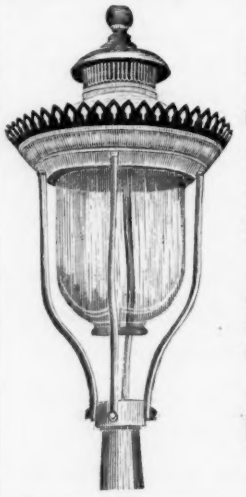

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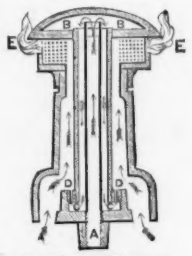
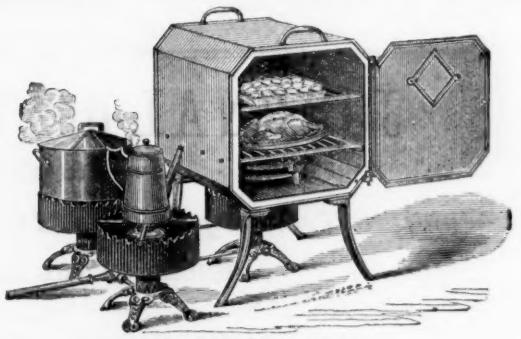


Principle of Burner.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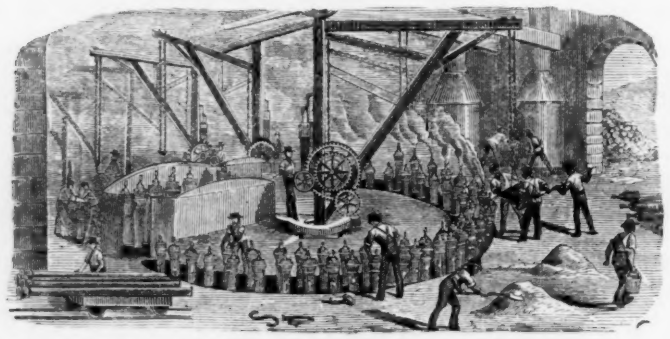

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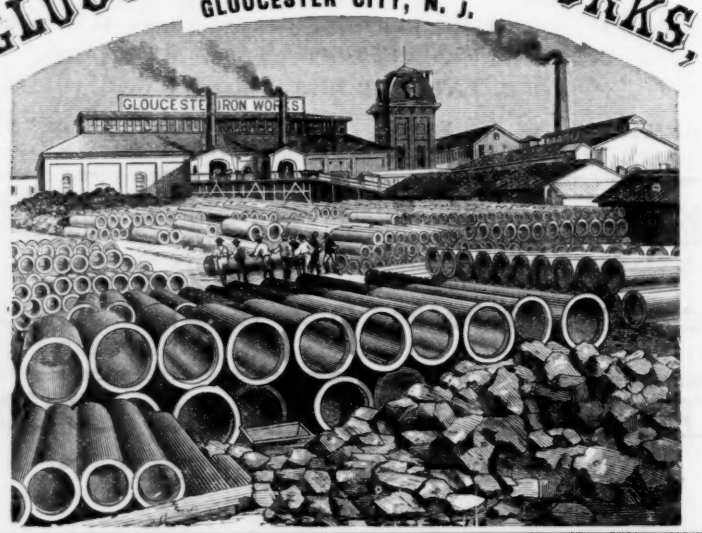

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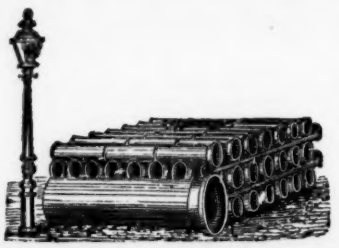

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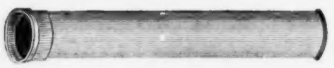

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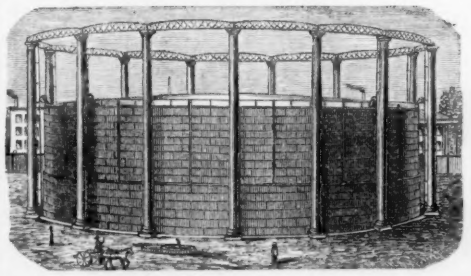

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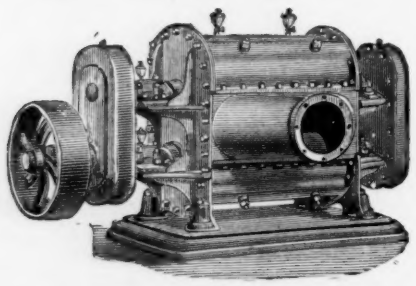

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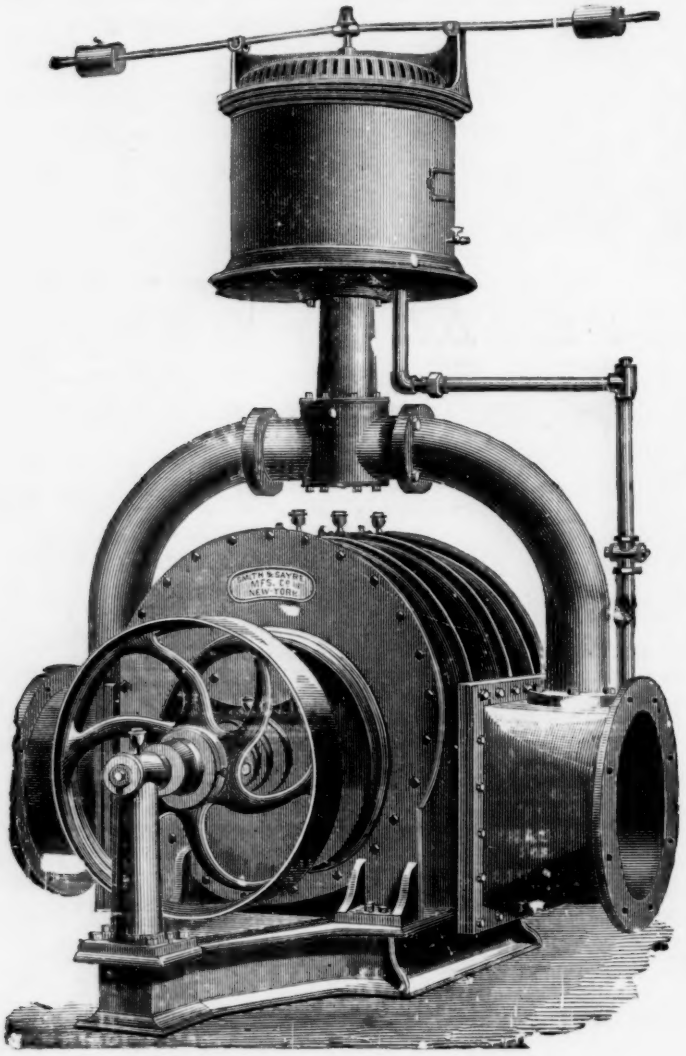

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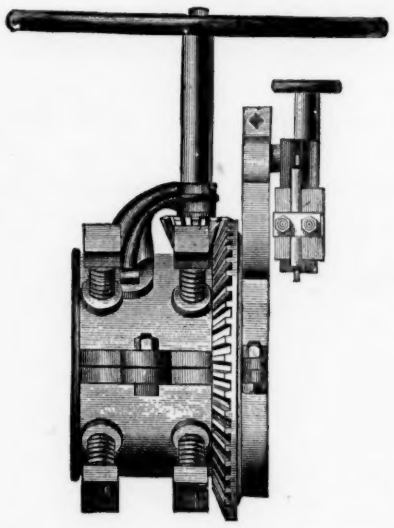

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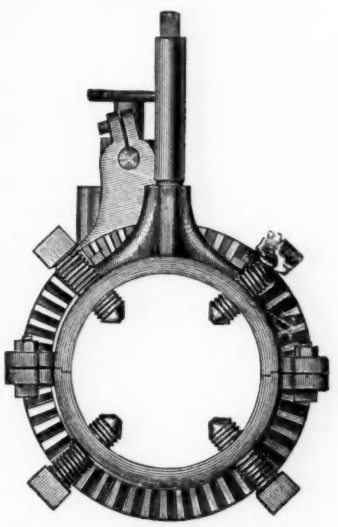

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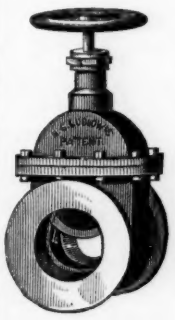

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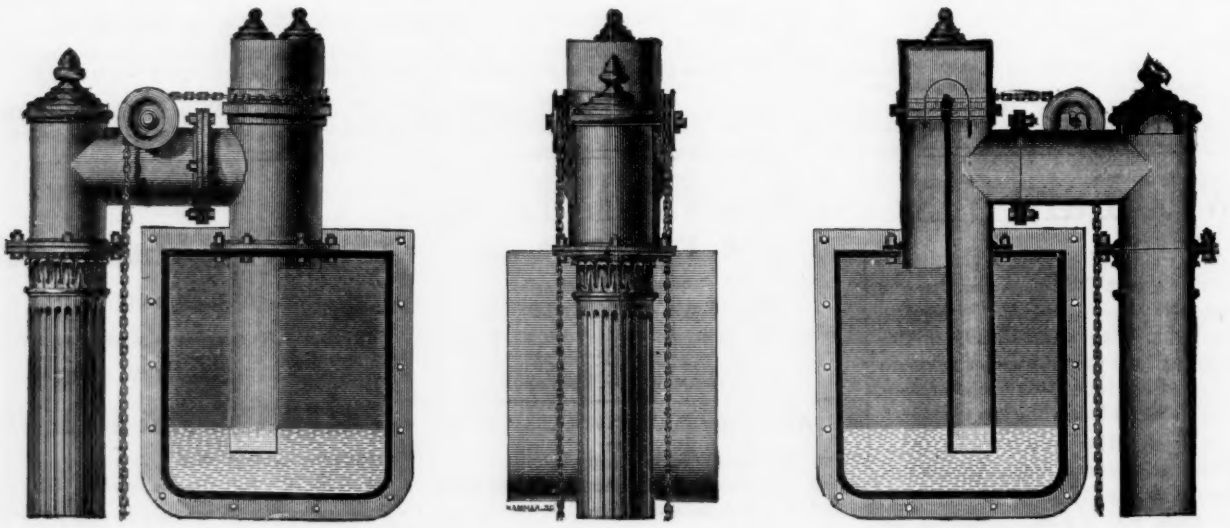

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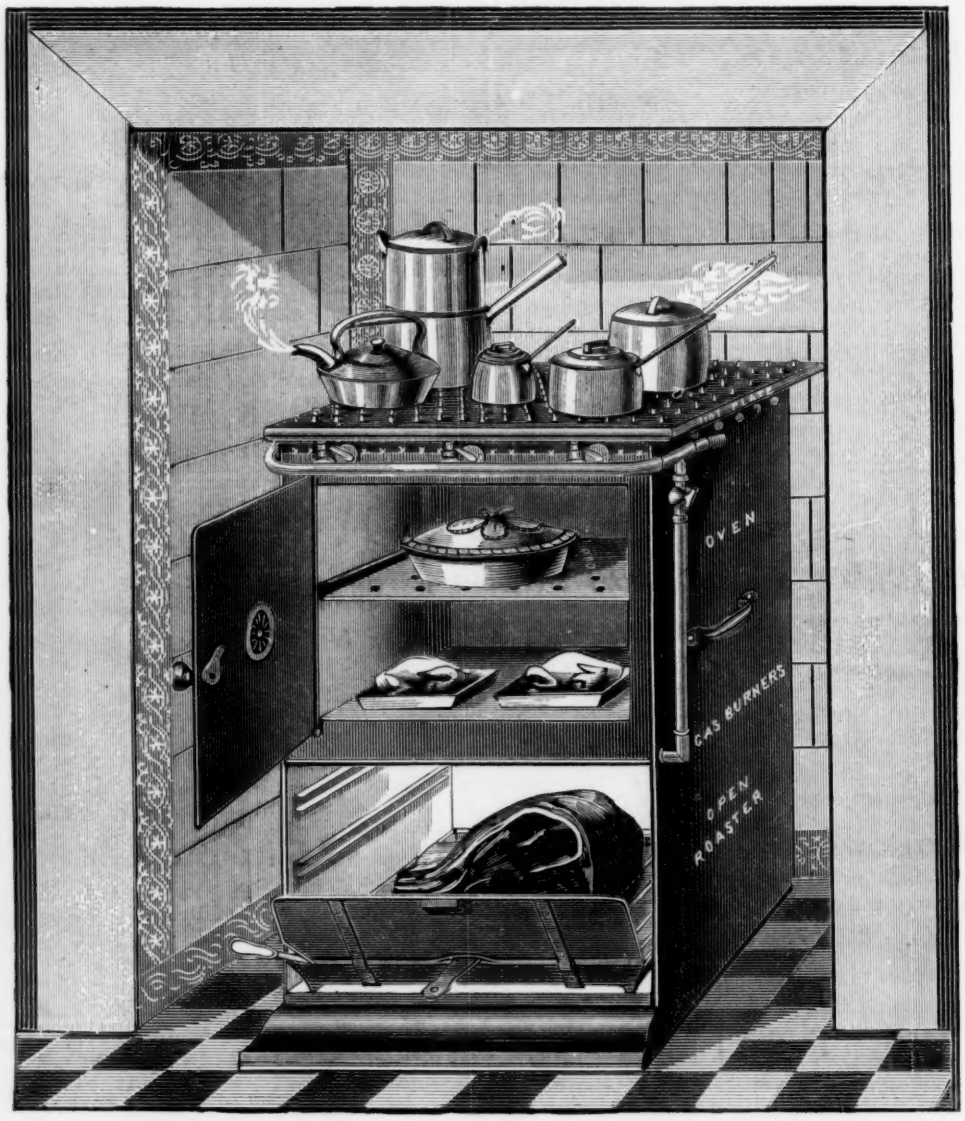

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